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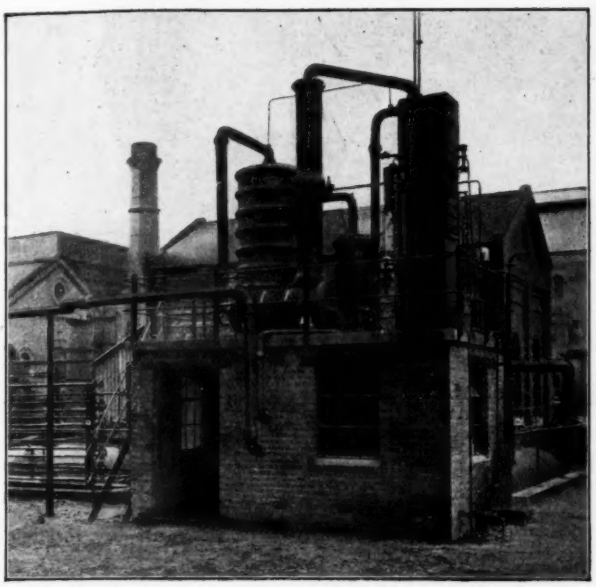

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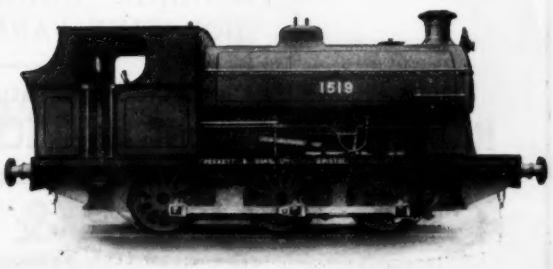

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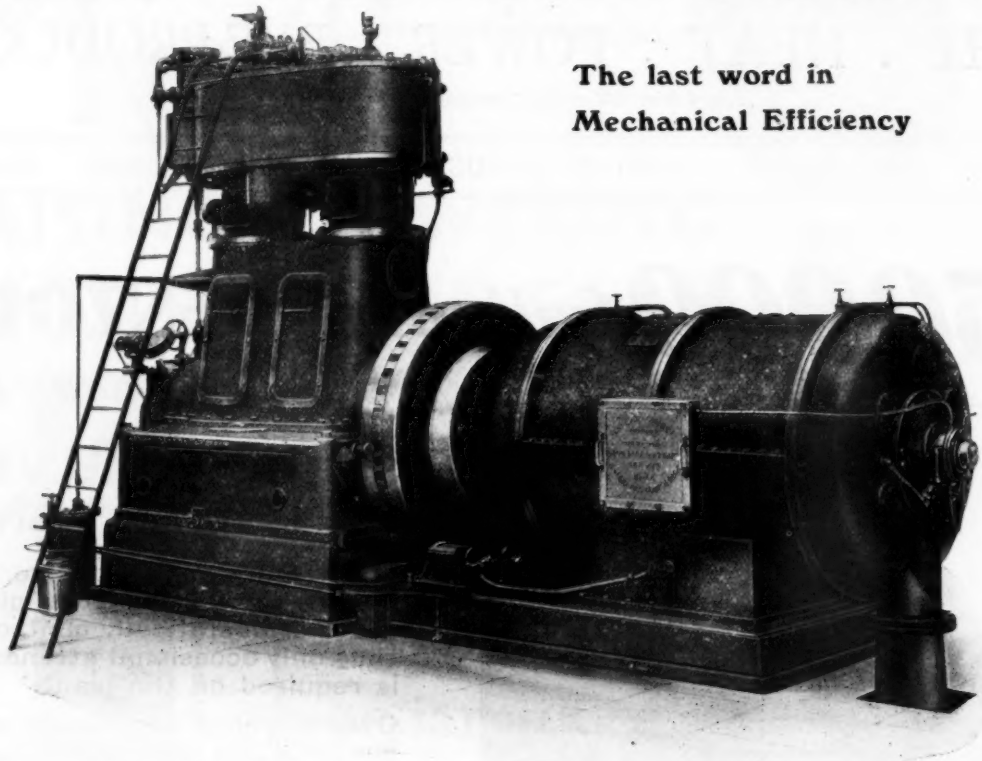

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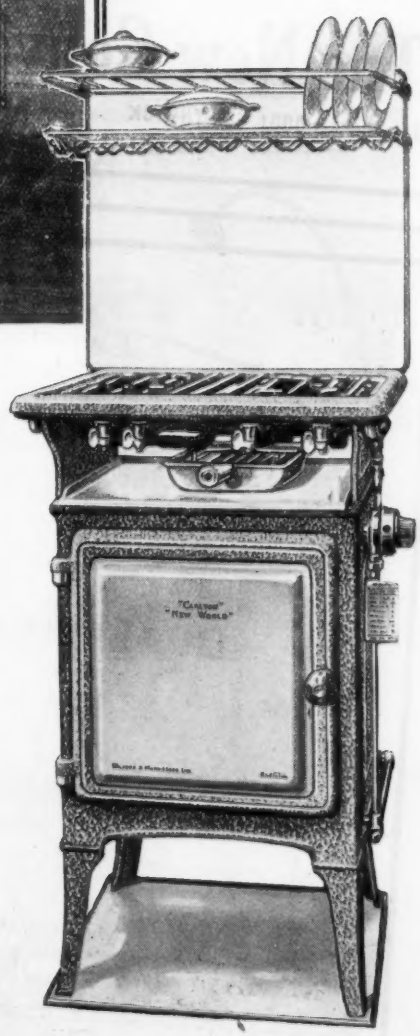

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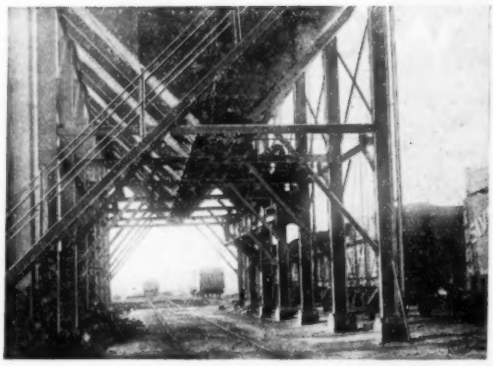

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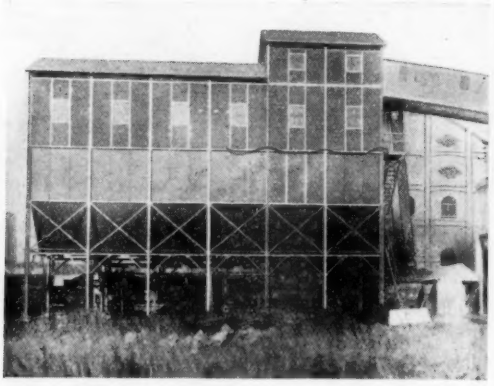

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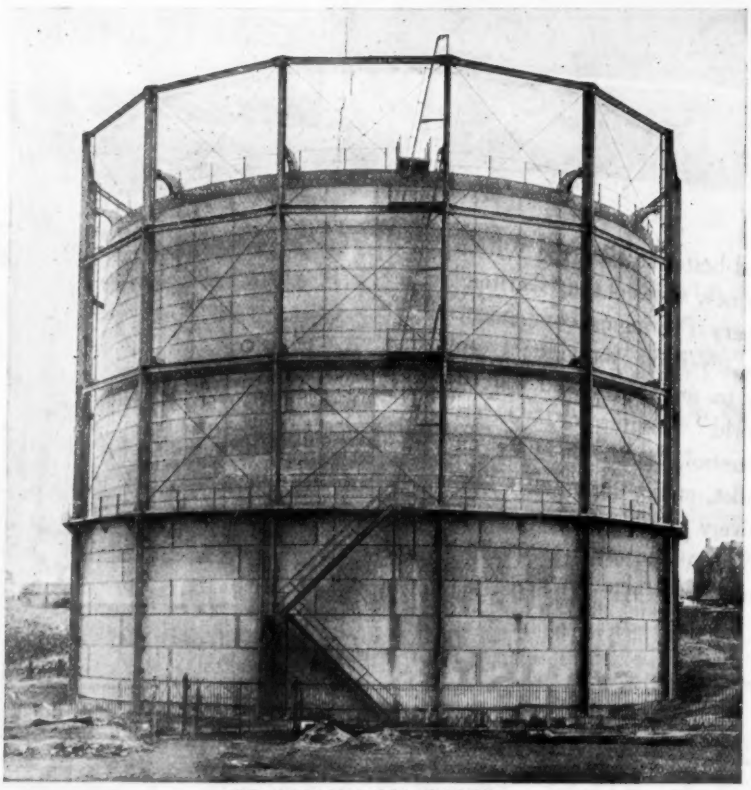

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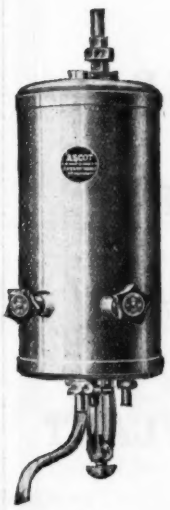
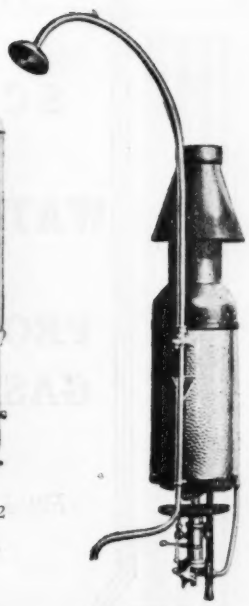


A 3/6

TYPE R 12



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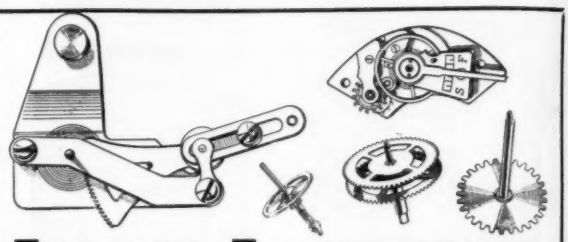

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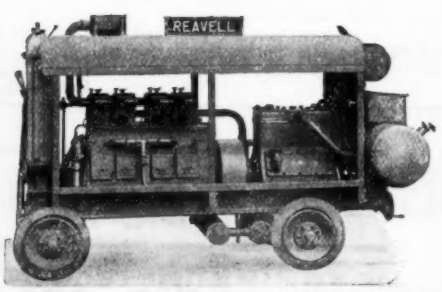

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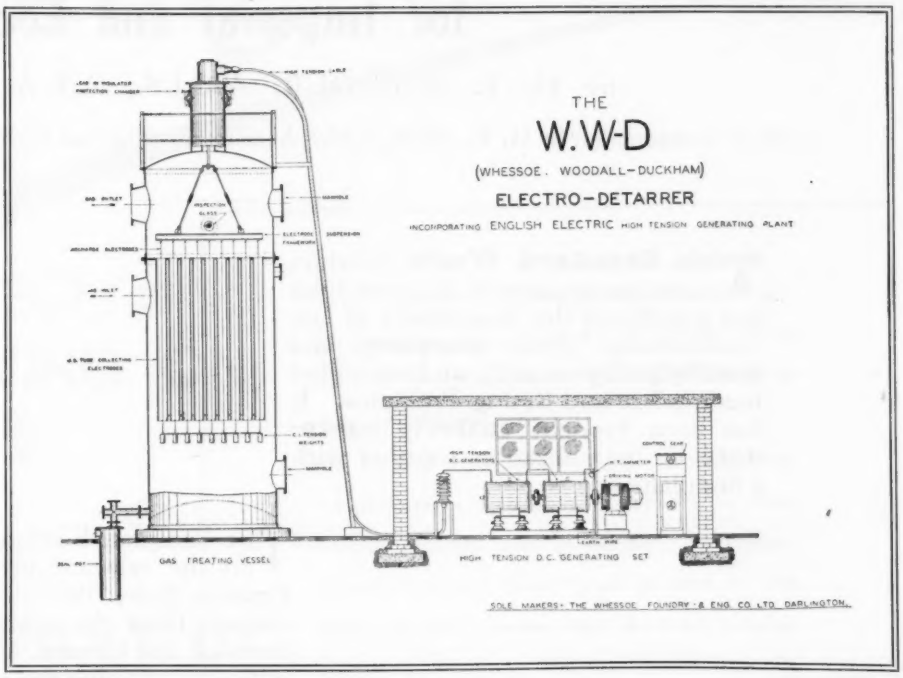

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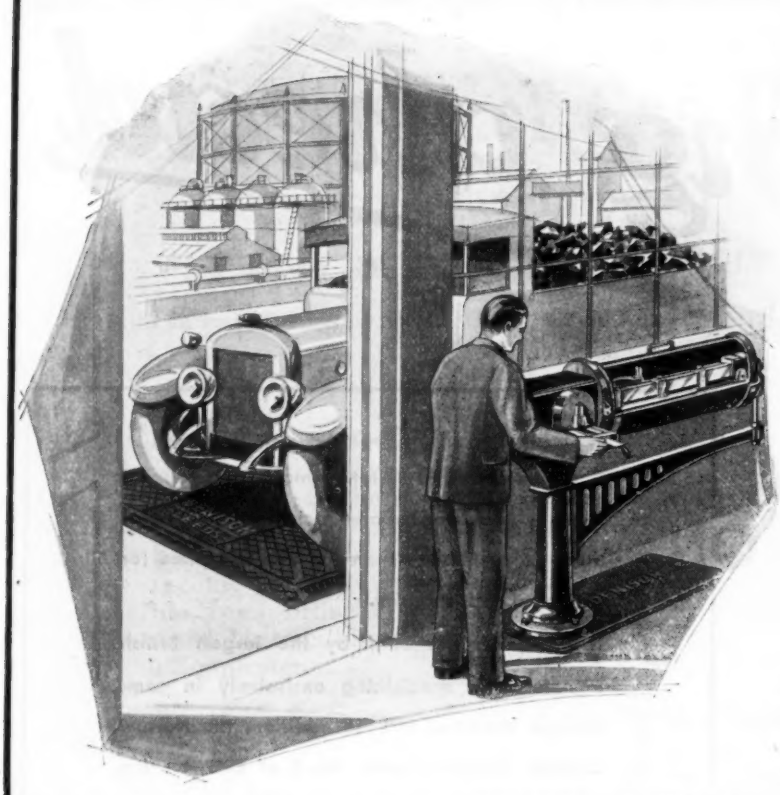

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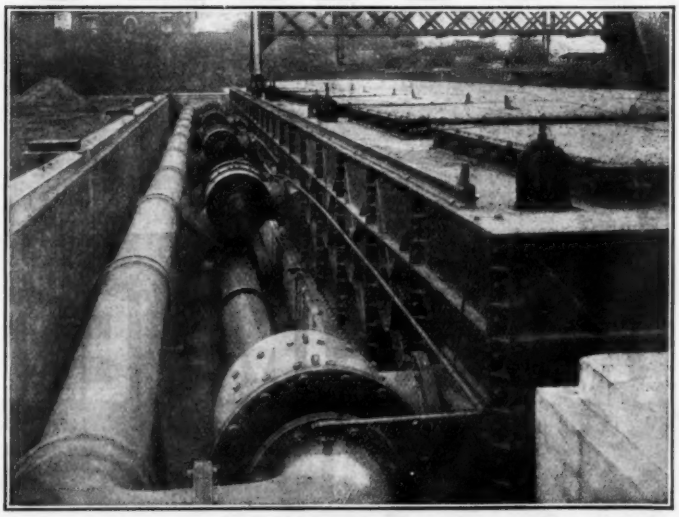

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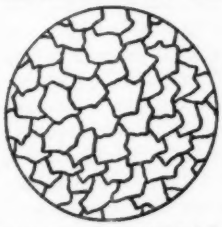

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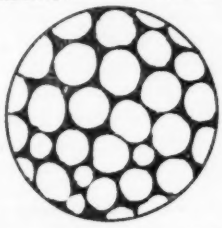

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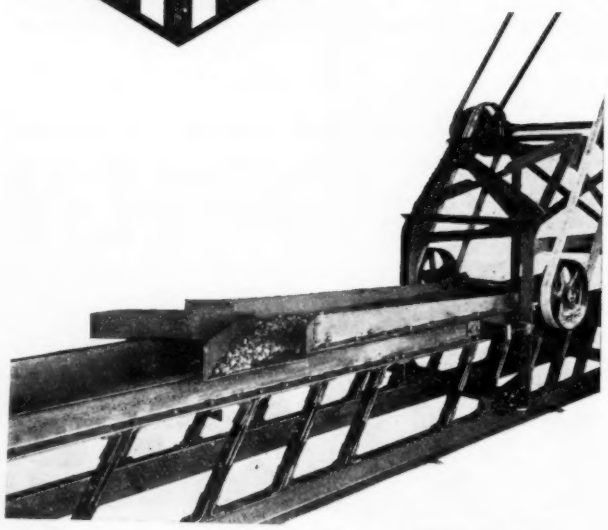

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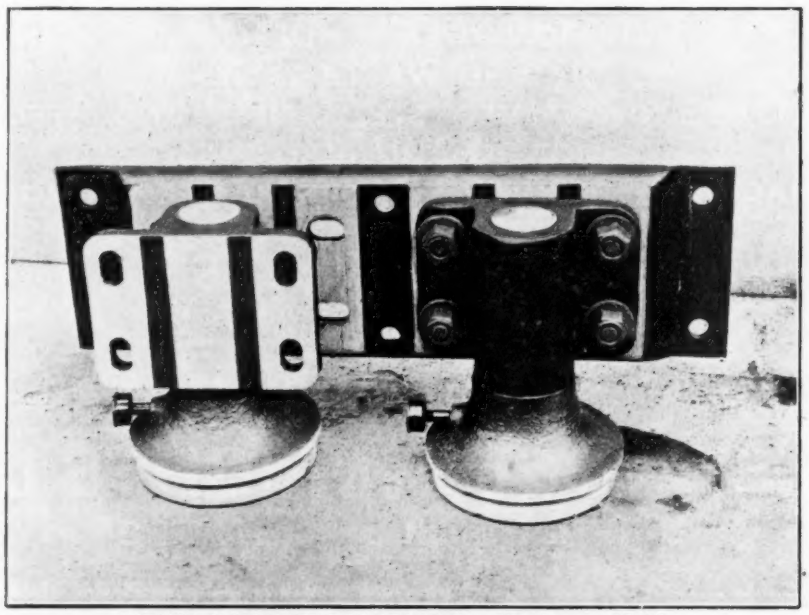

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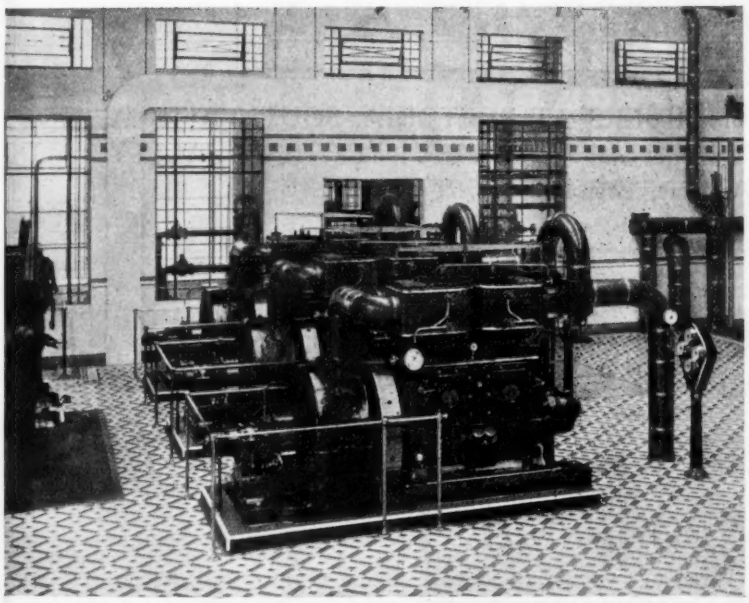

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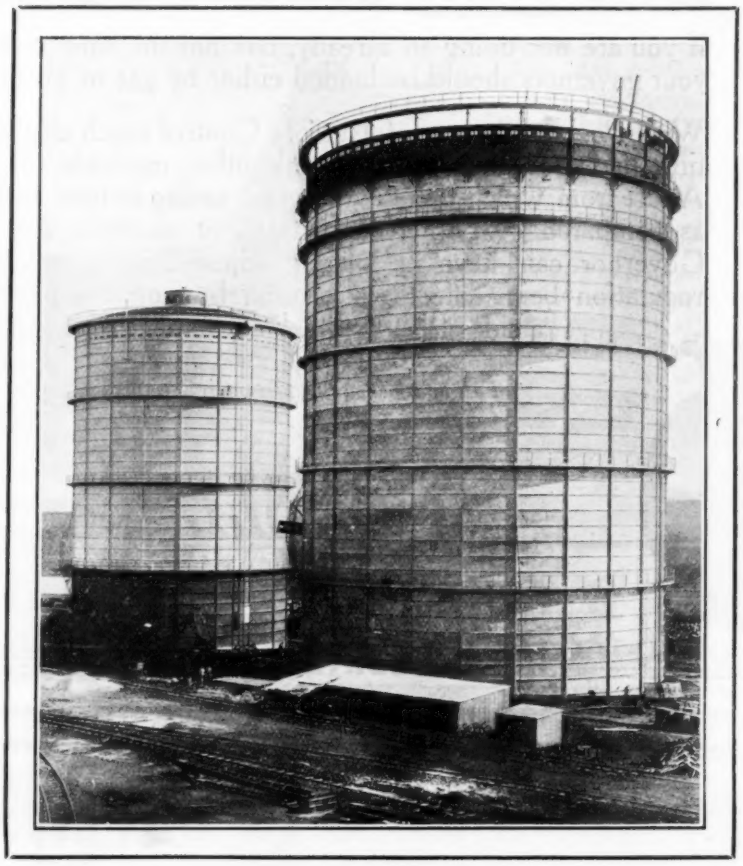

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THE HORSELEY BRIDGE & ENGINEERING CO., LTD., Tipton, Staffs.

Dependable in action even under the most arduous conditions, the PEGSON RAMMER is chiefly used for consolidating the back filling of trenches. Not only can the operative control the rapidity with which the blows are delivered, but the weight of each blow can be varied at will.

PEGSON, LTD., COALVILLE, LEICESTER

BRITISH BUILT

"There are good profits in selling VALOR OIL, CABINETS & DRUMS!

In 12, 30 and 50 gln. sizes.

In sizes 6 to 50 glns.

In 5 and 10 gln. sizes.

VALOR OIL CABINETS and Drums look the very thing for their job standing in your shop . . . and they fill a long-felt need. They attract customers by *obvious* efficiency. Show how VALOR CABINETS keep oil (household paraffin, lubricating, etc., etc.) pure and clean, dust-proof and fire-proof . . . show how they keep oil locked, how the quantity of oil held is shown by the measuring rod, how all overflow returns into the well of the cabinet.

Every VALOR CABINET sells another. Your turnover is speedy and our terms are generous. We help you with advertising, showcards, cut-outs, give-away literature and electros.

Write for discounts and list 39/V10.

C.9.

THE VALOR CO., LTD.
Valor Works, Bromford, Erdington, BIRMINGHAM.
LONDON: 120, Victoria St., S.W. 1.
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VALOR
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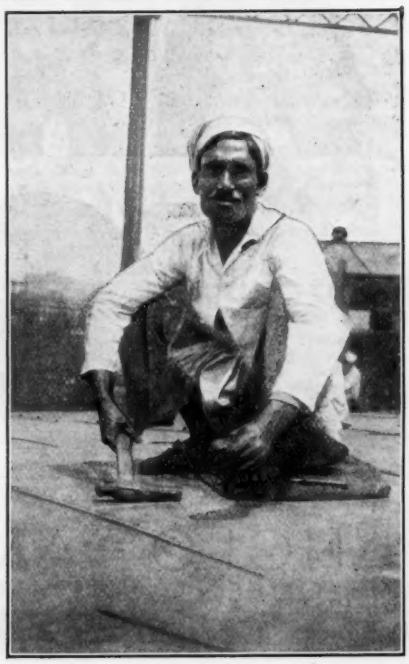
CLAYTON SON & CO LIMITED HUNSLET LEEDS



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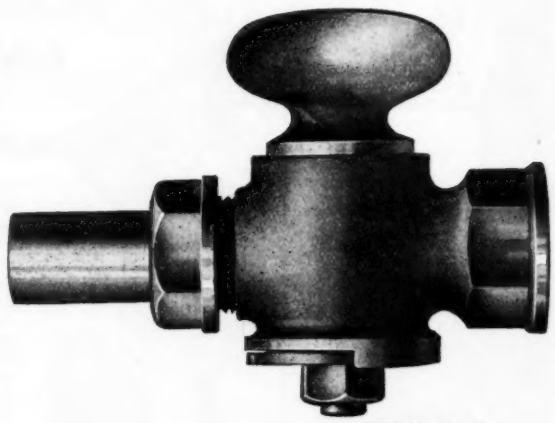
Quality



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GUN-METAL MAIN COCKS

GEORGE ORME & CO.
(Branch of Meters Ltd.)
ATLAS METER WORKS
OLDHAM

We shall be pleased to receive enquiries for
SAMPLES & PRICES

ENQUIRIES INVITED FOR

Anglo's GAS OIL

ANGLO-AMERICAN OIL CO. LTD.
36 QUEEN ANNE'S GATE-WESTMINSTER - LONDON - S.W.I.
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"BEATRICE" COOKERS

The cooker of to-day

WITH EIGHT OUTSTANDING NEW FEATURES

Besides the Standard Finish (Grey Mottle) "Beatrice" Gas Cookers can now be obtained in Green "Snowdrift" Mottle Enamel.

- **ONE BURNER OVEN AND BOTTOM FLUE OUTLET.**
- ONE PIECE ALL STEEL GATES AND OVEN SHELVES.
- **MAXIMUM COOKING SPACE IN OVEN, WITH *NO PROJECTIONS AND CONSEQUENT EASE IN CLEANING.***
- HOT PLATE BURNERS SPACED TO GIVE FULLEST EFFICIENCY.
- HOT PLATE BARS IN TWO SECTIONS ONLY AND CANNOT BE WRONGLY REPLACED.
- OVEN AND DOOR LINED WITH CELLULAR ASBESTOS.
- GREY MOTTLE AND WHITE ENAMEL FINISH AS SHOWN.
- SPRING LOADED CHROMIUM PLATED TAPS. SAFETY SELF-LOCKING OVEN TAP.

Provincial Selling Agents in Great Britain and Ireland for Gas Fires, Radiators, and Cookers manufactured by John Harper & Co., Ltd.

ECONOMIC GAS BOILER Co., Ltd., Junction Mills, Burnley.

Telephone: 3305 Burnley. Telegrams: Bluboilers Burnley.

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Telephone: Battersea 6008. Telegrams: Litetrades, 'Phone, London.

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London Office: ATLANTIC HOUSE 45/49 HOLBORN VIADUCT, E.C.1

Telephone: HOLBORN 5154 Telegrams: OILGAS, CENT. LONDON

"What did Gladstone say in 1875?"

is a question which is frequently asked. Some know the answer; probably others do not. But how many know just where to look to find what Gladstone *did* say?

What did somebody say about Phenol Extraction, or Bottled Gas, or Gum Deposits, in 1932?

is a question which is much more likely to arise in your daily work. You may know the answer, if not, you will find it at once in the

TECHNICAL SIGNPOST

full particulars of which were given in the "Journal," July 26, page 193.

Price **3/6** post free

Orders and Enquiries to WALTER KING, LTD.
11, Bolt Court, Fleet Street, London, E.C. 4.

The
"K.C.U."

The Water Heater
that enabled Gas to
solve the problem
of washing-up at
the kitchen sink

★ With the 'K.C.U.' there is
NO CONDENSATE

ARDEN HILL & CO., LTD., ASTON, BIRMINGHAM, 6

Radiation

Humphreys & Glasgow Ltd.
Water-Gas

	Cu. Ft. Daily
Aarhus	80,000
Abertillery	500,000
Abertillery	100,000
Admiralty:	
British	4,000,000
French	1,600,000
Agram	200,000
Airdrie	430,000
Aldershot	1,400,000
Aldershot	1,000,000
Aldershot	1,316,000
Algiers	1,760,000
Alkmaar	400,000
Allenstein	200,000
Alost	700,000
Amersfoort	300,000
Amsterdam	1,000,000
Amsterdam	1,000,000
Amsterdam	2,700,000
Amsterdam	1,350,000
Antwerp	1,500,000
Antwerp	1,000,000
Antwerp	1,500,000
Antwerp	1,900,000
Arundel	215,000
Ascot	423,000
Ashford	250,000
Athens, Greece	550,000
Augsburg	425,000
Aylesbury	150,000
Aylesbury	470,000
Banbury	200,000
Banff	125,000
Barmen	500,000
Barnsley	588,000
Barrow	300,000
Barrow	500,000
Barry	500,000
Barry	720,000
Bath	1,000,000
Bath	1,000,000
Bath	1,300,000
Bath	1,200,000
Bedford	1,000,000
Belfast	1,700,000
Belfast	4,500,000
Belfast	1,250,000
Belfast	1,250,000
Belfast	2,250,000
Benrath	125,000
Berkhamstead	259,000
Berlin:	
Charlottenb'g	2,500,000
Danziger Str.	1,630,000
Neukoelln	1,350,000
Schmargendorf	76,000
Tegel	10,095,000
Berne, Switz.	725,000
Bexhill	400,000
Bideford	258,000
Bilston	375,000
Bilston	125,000
Birmingham:	
Adderley St.	675,000
Adderley St.	850,000
Nechells	3,000,000
Nechells	3,000,000
Nechells	3,000,000
Nechells	7,650,000
Swan Village	1,500,000
Windsor St.	3,000,000
Windsor St.	3,000,000
Windsor St.	6,100,000
Bishop's Stortford	200,000
Bishop's Stortford	300,000
Bishop's Stortford	200,000
Bishop's Stortford	300,000
Blackburn	1,190,000
Blantyre	150,000
Blois	125,000
Blois	125,000
Bochum	530,000
Bognor	423,000
Bognor	500,000
Bo'ness	125,000
Bo'ness	250,000
Boulogne	340,000
Bournemouth	1,000,000
Bournemouth	500,000
Bournemouth	1,500,000
Bournemouth	1,000,000
Bournemouth	500,000
Bournemouth	1,533,000
Bournemouth	2,000,000
Bournemouth	500,000
Bournemouth	2,750,000
Bradford	1,200,000
Bremen	550,000
Bremen	950,000
Bremen	950,000
Brentwood	250,000
Brescia	588,000
Brescia	588,000
Brest	550,000
Bridgwater	200,000
Bridlington	150,000
Bridlington	200,000
Bridlington	550,000
Brieg	100,000
Brierley Hill	250,000
Brierley Hill	425,000
Brighton	1,750,000
Brighton	1,850,000
Brighton	750,000
Brighton	2,750,000
Brighton	3,000,000
Bristol	2,000,000
Bristol	2,500,000
Bristol	825,000
Bristol	825,000
Bristol	1,500,000
Bromley	1,500,000
Bruges	200,000
Bruges	600,000
Brussels:	
Anderlecht	350,000
Anderlecht	350,000
Forest	1,000,000
Forest	1,000,000
Forest	1,000,000
Forest	1,500,000
Forest	88,000
Koekelberg	1,000,000
St. Gilles	1,000,000
Brussels:	
St. Josse	1,000,000
St. Josse	600,000
St. Josse	775,000
Ville	750,000
Ville	750,000
Ville	1,500,000
Ville	350,000
Bucarest	1,100,000
Buckie	164,000
Budapest	50,000
Budapest	1,760,000
Budapest	209,000
Budapest	250,000
Burnley	1,350,000
Caen	250,000
Cambridge	500,000
Cambridge	1,000,000
Cambridge	1,700,000
Cardiff	2,000,000
Cardiff	3,000,000
Cardiff	1,950,000
Cardiff	600,000
Carlisle	600,000
Carlsruhe	580,000
Carnarvon	248,000
Charleroi	1,250,000
Chateauroux	125,000
Chateauroux	125,000
Chatelet	500,000
Chester	564,000
Chesterfield	430,000
Chesterfield	90,000
Chesterton	197,000
Chichester	250,000
Chorley	300,000
Cie. de Béthune	2,145,000
Cie. des Compteurs	1,150,000
Cie. Lorraine de Ch.	210,000
Cie. Minesde Roche	585,000
Coatbridge	400,000
Commercial, L'n	850,000
Commercial	850,000
Commercial	1,250,000
Commercial	2,000,000
Commercial	2,100,000
Copenhagen	700,000
Copenhagen	2,500,000
Copenhagen	1,750,000
Copenhagen	1,200,000
Courtrai	250,000
Coventry	600,000
Coventry	600,000
Coventry	1,000,000
Coventry	1,250,000
Coventry	350,000
Cowdenbeath	420,000
Cracow	400,000
Cranleigh	188,000
Crefeld	500,000
Crewe	700,000
Crewe	800,000
Crosfield & Sons	1,500,000
Crosfield & Sons	1,500,000
Croydon	1,250,000
Croydon	625,000
Croydon	625,000
Croydon	550,000
Croydon	650,000
Croydon	1,125,000
Croydon	850,000
Croydon	3,000,000
Croydon	6,000,000
Deal	250,000
Deal	250,000
Debreczin	100,000
Derby	1,500,000
Derby	2,000,000
Deventer	150,000
Deventer	200,000
Devonport	1,000,000
Devonport	1,100,000
Doncaster	1,350,000
Dorking	150,000
Dorking	300,000
Dorking	130,000
Dover	500,000
Dover	300,000
Dublin	2,000,000
Dublin	2,000,000
Dublin	650,000
Dudley	600,000
Dundee	1,500,000
Dundee	1,650,000
Dundee	900,000
Dunedin, N.Z.	150,000
Dunedin	275,000
Durham	200,000
Dusseldorf	1,000,000
Eastbourne	1,250,000
Eastbourne	1,550,000
Edinburgh	2,000,000
Edinburgh	2,800,000
Eindhoven	1,500,000
Electro-Chimie	650,000
Enschede	282,000
Epping	500,000
Epsom	225,000
Epsom	300,000
Essen	1,400,000
Essen-Borbeck	1,400,000
Exeter	1,100,000
Exeter	1,200,000
Exmouth	376,000
Falmouth	150,000
Falmouth	200,000
Farnham	300,000
Faversham	200,000
Flensburg	300,000
Flensburg	125,000
Folkestone	1,800,000
Fond. del Pignone	164,000
Forst	300,000
Frankenthal	175,000
Fuel Research Wks.	500,000
Fuel Research Wks.	500,000
Gabionz	140,000
Gas L. & C. Co.:	
Beckton	10,000,000
Beckton	7,000,000
Beckton	3,600,000
Beckton	7,000,000
Beckton	7,000,000
Gas L. & C. Co.:	
Beckton	5,250,000
Beckton	4,500,000
Beckton	3,000,000
Beckton	1,500,000
Bow Common	1,000,000
Bow Common	1,150,000
Bow Common	150,000
Brentford	1,200,000
Brentford	1,250,000
Brentford	350,000
Brentford	750,000
Brentford	6,000,000
Bromley	3,750,000
Bromley	2,250,000
Bromley	1,000,000
Bromley	1,000,000
Bromley	1,000,000
Bromley	1,450,000
Bromley	1,350,000
Fulham	2,500,000
Fulham	1,700,000
Grays	250,000
Grays	400,000
Grays	725,000
Ilford	650,000
Ilford	750,000
Kensal Green	2,250,000
Kensal Green	2,250,000
Kensal Green	2,250,000
Nine Elms	2,750,000
Nine Elms	750,000
Nine Elms	1,870,000
Nine Elms	2,850,000
Shoreditch	900,000
Shoreditch	2,700,000
Shoreditch	2,725,000
Southall	2,000,000
Southall	3,000,000
Staines	600,000
Stratford	1,700,000
Stratford	850,000
Stratford	2,350,000
Stratford	2,350,000
Geisenkirchen	525,000
Geneva	500,000
Geneva	700,000
Geneva	1,270,000
Gennevilliers	10,600,000
Gennevilliers	2,900,000
Girvan	235,000
Glasgow	3,000,000
Glasgow	2,500,000
Glasgow	2,250,000
Glossop	340,000
Gloucester	800,000
Gloucester	1,000,000
Gosport	200,000
Gosport	225,000
Göteborg	300,000
Göteborg	600,000
Göteborg	1,000,000
Graudenz	200,000
Groningen, Holland	500,000
Groningen	1,250,000
Guest Keen & P.	1,936,000
Guildford	300,000
Guildford	200,000
Guildford	350,000
Guildford	1,100,000
Guildford	150,000
Haarlem	850,000
Hamburg	1,750,000
Hampton Court	500,000
Hampton Court	600,000
Hampton Court	1,100,000
Hanley	800,000
Hanley	800,000
Hartlepool	750,000
Hartlepool	765,000
Hastings	1,250,000
Haywards Heath	470,000
Haywards Heath	500,000
Hebden Bridge	200,000
Heidelberg	200,000
Hereford	525,000
Hertford	197,000
Hertford	244,000
Hessle	150,000
Heywood	500,000
High Wycombe	752,000
Hilversum	850,000
Hilversum	1,000,000
Hinckley	250,000
Holyhead	197,000
Hong Kong	450,000
Hong Kong	450,000
Hornsey	1,000,000
Hornsey	1,000,000
Hornsey	750,000
Hornsey	750,000
Horsham	235,000
Houillère de Lievin	2,900,000
Hull	1,500,000
Hull	1,000,000
Hull	1,600,000
Innsbruck	200,000
Ipswich	750,000
Ipswich	1,250,000
Ipswich	600,000
Jersey	564,000
Jersey	564,000
Kampen	350,000
Karlsbad	350,000
Kendal	329,000
Kidsgrove	235,000
Kiel	1,000,000
Kiel	880,000
Kilmarnock	500,000
Kilmarnock	585,000
King's Lynn	197,000
King's Lynn	400,000
Kingston-on-Th.	3,400,000
Kirkintilloch	360,000
Kirkintilloch	827,000
Kolozvar	100,000
Lancaster	500,000
Langley Mill	500,000
Largs	235,000
Lausanne	250,000
Lausanne	385,000
Lausanne	970,000
Lea Bridge	350,000
Lea Bridge	350,000
Lea Bridge	400,000
Lea Bridge	1,000,000
Lea Bridge	1,500,000
Leamington	600,000
Leamington	525,000
Leatherhead	705,000
Leeds	1,500,000
Leeuwarden	400,000
Leicester	2,700,000
Leiden	500,000
Leiden	575,000
Leigh	350,000
Lemberg	260,000
Lemberg	500,000
Letchworth	362,000
Letchworth	423,000
Liége	1,000,000
Liége	750,000
Lille	860,000
Lincoln	500,000
Lincoln	893,000
Littlehampton	500,000
Liverpool	3,500,000
Liverpool	4,500,000
Liverpool	750,000
Liverpool	1,750,000
Liverpool	1,250,000
Liverpool	3,000,000
Liverpool	1,500,000
Liverpool	1,250,000
Liverpool	2,350,000
Liverpool	3,000,000
Liverpool	8,600,000
Long Eaton	430,000
Long Eaton	170,000
Longton	600,000
Louvain	800,000
Lubeck	400,000
Luton	400,000
Luton	300,000
Maastricht	200,000
Macclesfield	800,000
Magdeburg	1,400,000
Maidenhead	225,000
Maidenhead	225,000
Maidenhead	175,000
Maidenhead	175,000
Maidenhead	200,000
Maidenhead	200,000
Maidstone	500,000
Maidstone	500,000
Malines	500,000
Malines	575,000
Malmö	353,000
Malta	400,000
Manchester	3,500,000
Manchester	3,500,000
Manchester	1,500,000
Mansfield	330,000
Mansfield	493,000
Margate	960,000
Marlborough	100,000
Mayence	700,000
Melbourne	5,000,000
Merthyr Tydfil	300,000
Merthyr Tydfil	200,000
Middlesbrough	1,250,000
Middlesbrough	750,000
Middlesbrough	900,000
M/M. Woolston	9,000,000
Minehead	300,000
Monaco	275,000
Monaco	618,000
Monaco	618,000
Monaco	400,000
Complete Gasification	
Mons	500,000
Montevideo	1,222,000
Morecambe	333,000
Moscow	1,000,000
Munich	1,400,000
Namur	175,000
Narbonne	350,000
Nelson	400,000
Nelson	350,000
Neuchâtel, Switz.	250,000
Neuss	140,000
Newbury	250,000
Newcastle	2,500,000
Newcastle, N.S.W.	500,000
Newhaven	235,000
Newport Pagnell	188,000
Nice	900,000
Nice	1,295,000
Nictheroy	250,000
Nimes	429,000
North Middlesex	200,000
North Middlesex	200,000
North Middlesex	1,000,000
North Middlesex	1,600,000
North Middlesex	800,000
Complete Gasification.	
North Middlesex	900,000
2nd Complete Gasification.	
North Sydney	500,000
North Sydney	500,000
Norwich	1,000,000
Norwich	300,000
Norwich	500,000
Norwich	1,500,000
Nottingham	1,000,000
Nottingham	1,000,000
Nuneaton	125,000
Oberhausen	175,000
Oldbury	500,000
Oldenburg	200,000
Ormskirk	170,000
Ostend	100,000
Ostend	200,000
" Zandvoorde	700,000
Oxford	4,500,000
Palermo	968,000
Palermo	850,000
Paris:	
Clichy	4,000,000
Ivry	2,355,000
Landy	6,000,000
Landy	6,000,000
Landy	5,295,000
La Villette	4,000,000
La Villette	2,000,000
La Villette	2,000,000
Paris-Plage	125,000
Pau	550,000
Pavie	194,000
Pavie	212,000
Pembroke	240,000
Perigueux	350,000
Perth, W.A.	125,000
Perth, W.A.	1,000,000
Petone, N.Z.	200,000
Piggott & Co.	1,500,000
Plymouth	2,000,000
Poitiers	350,000
Pontypool	120,000
Port Elizabeth	400,000
Portsmouth	1,000,000
Portsmouth	2,000,000
Portsmouth	830,000
Portsmouth	2,000,000
Posen	450,000
Posen	700,000
Prague	140,000
Preston	1,400,000
Ramsgate	430,000
Reading	1,000,000
Reading	1,000,000
Redditch	600,000
Redhill	530,000
Redhill	275,000
Redhill	300,000
Redhill	1,100,000
Redhill	625,000
Reichenberg	400,000
Reval	350,000
Rhymney	175,000
Rhymney	250,000
Riddings	258,000
Ripley	120,000
Rochester	2,200,000
Rochester	2,800,000
Romford	330,000
Romford	350,000
Romford	1,200,000
Rotterdam	850,000
Rotterdam	1,500,000
Rotterdam	750,000
Rotterdam	750,000
Rotterdam	600,000
Rotterdam	2,000,000
Rotterdam	500,000
Roulers, Belgium	250,000
Royston (Yorks.)	250,000
Rugby	1,000,000
Rugby	450,000
Rushden	425,000
Rushden	517,000
Rushden	225,000
Ryde	600,000
Ryde	600,000
Saffron Walden	235,000
St. Albans	700,000
St. Albans	580,000
St. Albans	1,500,000
St. Andrews	210,000
St. Andrews	409,000
St. Gallen	225,000
St. Gallen	225,000
St. Nicolas, Belgium	250,000
Sté. Ch.Gr. Paroisse	1,320,000
Sté Ch Gr Paroisse	2,900,000
Sté. I. & F. de Lens	1,130,000
Sté. I. & F. de Lens	1,130,000
Sté. Kuhlmann	1,285,000
Sté. Kuhlmann	3,200,000
Sté. Kuhlmann	2,150,000
Sté. Kuhlmann	3,830,000
Sté. Tubes Meuse	545,000
San Paulo	700,000
Scarborough	800,000
Scarborough	200,000
Scarborough	350,000
Scarborough	1,300,000
Scarborough	1,350,000
Seaford	200,000
Shanghai	225,000
Shanghai	225,000
Shanghai	1,600,000
Shanghai	2,200,000
Shanklin	259,000
Shanklin	400,000
Sheerness	200,000
Sheerness	180,000
Sheerness	200,000
Sheerness	220,000
Sheffield	1,530,000
Sheffield	3,000,000
" Steel Prods.	3,000,000
Shirebrook	500,000
Shrewsbury	300,000
Shrewsbury	170,000
Sidmouth	225,000
Singapore	600,000
Sittingbourne	259,000
Southampton	800,000
Southampton	500,000
Southampton	600,000
Southampton	100,000
Southampton	1,000,000
Southampton	1,450,000
Southend	1,250,000
Southend	900,000
Southend	900,000
Southend	600,000
Southgate	400,000
Southgate	500,000
Southgate	800,000
Southgate	500,000
Southport	750,000
Southport	900,000
Southport	900,000
Southport	450,000
South Shields	650,000
South Shields	1,250,000
Stafford	500,000
Stafford	750,000
Stettin	880,000
Steyning	150,000
Stirling	400,000
Stirling	970,000
Stockholm	1,500,000
Stockholm	1,750,000
Stockport	600,000
Stockport	600,000
Stockport	400,000
Stockport	400,000
Stockton	500,000
Stockton	250,000
Stourbridge	500,000
Stourbridge	500,000
Sunderland	2,250,000
Sunderland	300,000
Sunderland	475,000
Sutton	1,269,000
Sutton	1,625,000
Swanage	300,000
Swansea	750,000
Swansea	1,000,000
Swansea	450,000
Swansea	1,250,000
Swansea	2,000,000
Swindon	300,000
Swindon	450,000
Swindon	400,000
Sydney	1,000,000
Sydney	1,000,000
Sydney	1,000,000
Sydney	8,250,000
Sydney	2,750,000
Taunton	225,000
Taunton	350,000
Tawe Valley	275,000
Teignmouth	200,000
The Hague	1,000,000
The Hague	500,000
The Hague	1,750,000
The Hague	1,500,000
The Hague	775,000
The Hague	1,500,000
The Hague	2,930,000
Tilburg	400,000
Tirlemont	120,000
Tokyo	2,000,000
Torquay	350,000
Torquay	350,000
Torquay	320,000
Tottenham	750,000
Tottenham	750,000
Tottenham	350,000
Tottenham	1,000,000
Tottenham	1,000,000
Tottenham	1,250,000
Tottenham	2,500,000
Tottenham	1,000,000
Tottenham	500,000
Tottenham	1,000,000
Toulouse	1,800,000
Toulouse	785,000
ToulouseNatl. Wks.	2,400,000
ToulouseNatl. Wks.	6,200,000
ToulouseNatl. Wks.	3,730,000
Tournai	700,000
Tours	350,000
Trowbridge	250,000
Trowbridge	150,000
Tunbridge Wells	1,000,000
Tunbridge Wells	1,000,000
Tunis	175,000
Tynemouth	1,100,000
Tynemouth	1,100,000
Ulm	400,000
Union Chim.-Belge	1,027,000
Utrecht	1,000,000
Utrecht	1,000,000
Uxbridge	752,000
Uxbridge	1,000,000
Vancouver	3,840,000
Verviers	1,000,000
Vevey, Switz.	650,000
Victoria, B.C.	500,000
Vienna	3,500,000
Vienna	2,500,000
Walsall	750,000
Walsall	375,000
Waltham	400,000
Waltham	140,000
Walton-on-Thames	970,000
Wandsbek	125,000
Wandsworth	1,800,000
Wandsworth	4,230,000
Wanganui, N.Z.	376,000
Ware	150,000
Ware	282,000
Warwick	125,000
Wasmuel	500,000
Watford	300,000
Watford	350,000
Watford	400,000
Watford	1,250,000
Wath	430,000
Weimar	100,000
Wellingborough	525,000
Wellingborough	525,000
Wellingborough	550,000
Wellington, N.Z.	350,000
Wellington	300,000
West Bromwich	550,000
Westgate	250,000
Weston-Mare	350,000
Weston-Mare	350,000
Weston-Mare	150,000
Weston-Mare	150,000
Weston-Mare	500,000
Wexford	100,000
Weymouth	400,000
Weymouth	10,000
Weymouth	658,000
Whitstable	425,000
Widnes	500,000
Wiesbaden	850,000
Wigston	250,000
Winchester	225,000
Winchester	125,000
Winchester	410,000
Winchester	325,000
Woking	460,000
Wolverhampton	1,500,000
Wolverhampton	1,000,000
Wolverhampton	250,000
Wolverhampton	400,000
Worthing	525,000
Yarmouth	500,000
Yarmouth	125,000
Yeovil	340,000
Zwolle	200,000
Zwolle	200,000
Zwolle	700,000

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Humglas House, Carlisle Place, London, S.W.1.

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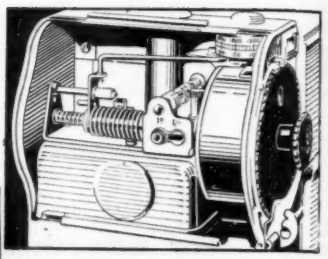

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THE GAS JOURNAL

AUGUST 2, 1933

Vol. 203. 85th Year No. 3663

A Glance at the Contents—

Post of Assistant Manager Vacant.

A commencing salary of £250 per annum is offered by a Municipal Gas Undertaking for an Assistant Manager. [p. 266.]

Assistant Sales Superintendent Required.

A Gas Company in Yorkshire is inviting applications for the position of Assistant Sales Superintendent, the commencing salary offered being £350 per annum. [p. 266.]

Public Gas Lighting to the Fore.

Further gratifying announcements are made to-day in regard to the renewal of public lighting contracts by gas over periods of years from widely separated parts of the British Isles. [p. 251.]

Manager Required for Scottish Works.

Applications are invited for the position of Works Manager at the Uddingston Gas-Works. The salary offered is £445 per annum, less an economy cut of 10%, with free house, coal, and gas. [p. 266.]

Oil-Coal Fuels.

One of the Sections of the recent World Petroleum Congress in London dealt with the subject of "Oil-Coal Fuels." The session was on July 24, and we reproduce to-day the summary of the General Reporter. [p. 255.]

East Surrey Offer to Horsham.

The East Surrey Gas Company is offering to purchase from the proprietors of the Horsham Gas Company, Ltd., the whole of their holdings of the original "A" shares and the additional "B" shares in that Company. [p. 250.]

Institution Examinations.

The next Examinations in Gas Engineering will be held on April 28, 1934, and in Gas Supply on May 5, 1934. The Education Calendar for 1934 will be available in December next. Further particulars of the Examinations are given to-day. [p. 251.]

Society of British Gas Industries.

A Meeting of the Council was held at 56, Victoria Street, Westminster, S.W., on July 20—Mr. H. E. Bennet, the Chairman, presiding. [p. 250.]

A Simple Part-Rate System of Gas Charges.

Following the inspection of the Higginshaw Gas-Works at Oldham by members of the Manchester Association, on July 21, a paper was read by Mr. N. Hudson, of Mirfield, on the subject of a simple part-rate system of gas charges to cover all gas sales. [p. 257.]

Gas Exhibit in Chicago.

The Gas Industry's exhibit in Gas Industry Hall was dedicated at the Chicago Fair grounds on June 3 by Mr. Arthur Hewitt, President of the American Gas Association. He unveiled a tablet symbolic of the Industry's service to humanity through the medium of heat. [p. 252.]

Manchester Association Visit Oldham.

Members of the Manchester District Association of Gas Engineers visited on July 21 the reconstructed Higginshaw Gas-Works at Oldham. They were welcomed by the Mayor, and were subsequently entertained at luncheon by the Oldham Corporation Gas Committee. [p. 254.]

South-Eastern Gas Corporation.

The South-Eastern Gas Corporation announces that, as a result of the offers made to stockholders of the Broadstairs Gas Company and of the Gravesend and Milton Gas Light Company, acceptances have already been received in excess of the minimum quantity required. [p. 250.]

Oil from South Wales Coal.

A Conference convened at Cardiff on July 28 by the South Wales Industrial Development Council decided to set up a committee of experts, coal owners, and miners' representatives to explore the possibility of building a plant for the production of oil from coal under the Government's scheme for a guaranteed preference. [p. 252.]

Forthcoming Engagements

Aug. 15.—IRISH ASSOCIATION.—Annual Meeting at Waterford.

Sept. 4-7.—ASSOCIATION OF PUBLIC LIGHTING ENGINEERS.—Tenth Annual Meeting and Conference at Margate.

Sept. 5.—S.B.G.I.—Meeting of Council, 2.30 p.m.

Sept. 7.—NORTH BRITISH ASSOCIATION.—Annual Meeting in Paisley.

Sept. 12.—NATIONAL GAS COUNCIL.—Meeting of Central Executive Board. There will be no meeting of the Board during the month of August.

Sept. 21.—WALES AND MONMOUTHSHIRE ASSOCIATION.—Meeting at Porthcawl.

Sept. 25-27.—B.C.G.A.—Annual Conference at Bournemouth.

Nov. 7-8.—I.G.E.—Autumn Research Meeting.

EDITORIAL NOTES

Modern Selling Methods

IT is generally recognized that the flat-rate system of charge is not a business getter—apart from being inequitable between gas undertakings and their consumers and between various classes of consumers. If affords no facility for adjustment in price to allow fairly for the nature, extent, and period of demand. Many undertakings have adopted some form of optional multi-part tariff, and in every case to good effect. Among the latest recruits is the Mirfield Gas Company; and an account of the plan they have introduced is the subject of a paper by the Engineer, Manager, and Secretary, Mr. Norman Hudson, before the Manchester District Association of Gas Engineers.

The paper has special import, because it concentrates on the prepayment consumer. The difficulty which arises out of the position of prepayment consumers in connection with two-part tariffs for adoption at the will of individual consumers was discussed at some length by the Committee on Gas Legislation, and Mr. Hudson's method of overcoming the difficulty has singular interest. He has adopted a time-tariff attachment to the meter inlet. The consumer, before he can obtain his gas supply, must insert a coin in the attachment, whereupon, for a definite period—either seven days or fourteen days—the valve remains open. This prepayment constitutes the service charge; and after this charge has been met, the consumer is able to get his gas at a low commodity cost which operates immediately—a point emphasized by the author. Previously Mr. Hudson had introduced a block rate of increased discounts according to consumption, which, however, did not prove satisfactory. The meter still gave the same quantity of gas per coin, and the general feeling was that, since a penny only performed the same service, gas in fact remained expensive. In the author's words: "The psychological value of the amount of service obtained by putting one coin in a meter cannot be too strongly stressed, because the putting-in of the coin is the action most performed, and as a result creates the most permanent impression. On the other hand, rebate or discount is only given once in a period of weeks—that is, each time the meter is emptied."

There is a great deal to be said for this argument, and we believe that the original method introduced at Mirfield, where 60% of the total sales is accounted for by the prepayment consumer, will meet with great success. The average prepayment consumer cannot pay in one lump sum a substantial service charge; but under the Mirfield plan he pays the service charge gradually at the rate of sixpence a week. He can insert sixpence each week, or a shilling every fortnight; for the clockwork mechanism has a fifteen-day movement, and the attachment can be operated by either coin. The device, by the way, is manufactured by the Horstmann Gear Company, Ltd., of Bath. After the service charge has been met, the consumer gets his gas at half the price he would pay under the old flat-rate system of charge. At Mirfield prices the commodity charge is competitive with any other form of energy. For a prepaid service charge of sixpence a week, therefore, a consumer can substitute gaseous fuel—with all the cleanliness and labour saving it entails—for solid fuel, in the knowledge that his household expenses will not increase. We think that the plan will have a wide appeal. It is simple and direct, and readily understood by every consumer. For the ordinary consumer, of course, the prepaid service charge is 6s. 6d. a quarter.

There can be no doubt of the Mirfield Gas Company's wisdom in taking steps to reduce the number of unremunerative consumers, for it is certain that, if the gas undertakings generally fail to offer attractive multi-part tariffs in place of existing flat rates, the list of unremunerative consumers will grow, and the good customers will have a bigger burden to shoulder.

Gas Supply Charges in Germany

WHILE discussing methods of charging for gas in this country, it may be well to glance briefly at modern practice in the same respect in another highly industrialized country, and the opportunity of taking Germany as an example is presented by the publication of a comprehensive book on "Price Policies of German Public Utility Undertakings," by H. E. Batson, B.Sc. (Econ). This book deals principally with the recent history of the policies which govern the charges made in Germany for gas, water, electricity, and tramway services, and it has been just published, at the price of 12s. 6d. net, by the Oxford University Press (Humphrey Milford, Publisher to the University, Amen House, Warwick Square, London, E.C. 4). Four years ago Sir Richard Garton founded a studentship to enable a student of exceptional capacity to devote himself for a year or more to the study of social or economic problems of fundamental importance; and the first Garton studentship in the Social Sciences was awarded to Mr. Batson. The book now before us contains the first-fruits of this award.

The author explains that, with few exceptions, the first-hand investigations on which his book is based were restricted to the 28 towns in Germany which at the time (1930) had more than 200,000 inhabitants. This field was chosen partly because Germany has more large towns than any other European country, partly because German public utilities possess some very distinctive and important special characteristics, and partly because it is a field which, although so large and diversified, is still practically virgin soil. In a foreword, Mr. Stanley Baldwin points to the fact that, in selecting Public Utilities for detailed study, Mr. Batson has chosen a subject which is of fundamental importance and great contemporary interest; and to this we may add that the book makes special appeal to our own Industry, at a time when the need for a revision of methods of charging for gas is so generally under consideration. It was a big task that the author set himself, as is shown by the vast amount of information he has been able to set out.

As the result of his investigation, Mr. Batson has found that in Germany publicly-operated utility undertakings, at least in the larger towns, tend to employ more tariffs, and more complicated tariffs, than are employed by similar undertakings in private hands. This fact, and others, suggest to him that one of the two forms of management could profitably take some lessons from the other. Then as between one industry and another there are also lessons to be learned; and in both these respects such a book as that of Mr. Batson must prove of inestimable value. While recognizing the special considerations applying to the different industries, he feels that the dissimilarity in the number and type of tariffs in use in the gas, water, and electricity industries in the 28 cities selected for investigation, "suggests an undue amount of inter-industrial immobility of ideas." His conclusion is that in the Gas Industry in Germany there remains much room for experiment, while as regards electricity the chief need is perhaps for a certain measure of consolidation and standardization. "Large-scale selling is on the whole conducted more scientifically than small-scale, except—and the exception is important—where undertakings are persuaded into giving unnecessary concessions to the bargaining strength of some of their larger customers. The domestic and small industrial fields still offer great scope for development, and their tariffs merit special attention. There is at the present day a general political presumption against unnecessarily restrictive legislation concerning prices. A certain standardization of methods of charging is desirable as being helpful to consumers and as facilitating comparisons, but not at the cost of prevention of experiment. This would remain true even if one type of tariff

scheme were demonstrably superior to all others, which is still very far from being the case."

The plea of the author for special attention to the domestic and small industrial fields is amply justified by the stability of the load which these fields offer, and we agree that any standardization of methods of charge should not be at the expense of efforts to find the best possible basis; but so far as the British Gas Industry is concerned, we still await the most convincing evidence that could be forthcoming of the fact that "there is at the present day a general political presumption against unnecessarily restrictive legislation concerning prices."

What is the Best Gas Tariff?

PASSING over Mr. Batson's discussion of the characteristics of gas supply, we come to the chapter on charges, wherein he sets out the statistics he has gathered on the subject of tariffs. An idea of the extent of his work is to be gathered from the fact that in the 28 towns investigated 90 gas tariffs are in use, including 11 cases in which special prices may be quoted in special circumstances, although no list of such prices is published. Of these tariffs, 39 are one-part and 50 two-part; but no undertaking relies entirely upon flat-rate tariffs for dealing with all its customers. It appears that at the beginning of 1930, among 804 German gas undertakings, of domestic, industrial, and heating-gas tariffs, in each case 70% were two-part. The author, in his 28 towns, has come across instances of as many as seven different tariffs charged by one undertaking for as many different classes of customers.

An objection to the two-part tariff which Mr. Batson cites is the fact that it tends to drive away the custom of very small consumers, and another is that consumers are apt to be a little suspicious of it; but he deals convincingly with both. He realizes the danger of assuming that discouragement of very small consumers is necessarily an economic disadvantage, and quotes a trenchant statement by the Superintendent of the Kiel Gas-Works, who, speaking of those customers which his undertaking had lost through the introduction of the two-part tariff, pointed out that: "These 900 were presumably people who have cost us a great deal of money, and who to a certain extent have obtained low prices for themselves at the expense of the good consumers. That is not the purpose of the tariff, nor of the gas-works. The tariff should be as just as possible, and the two-part tariff alone is just for both parties." Mr. Batson thinks that the number of consumers who cost gas undertakings more than they pay them is probably much larger than is generally realized; and we are inclined to agree with him. He does not favour the two-part as an alternative tariff, as the effect of an alternative tariff is to allow the small consumers to escape payment of their proper share of costs. It seems that in Germany by far the most popular basis for the standing charge in a two-part tariff is the size of the meter.

Of the 28 cities covered by Mr. Batson's investigation, in 20 cases the gas and electricity supplies are both in the hands of the municipality, and usually (though not always consciously) a general price system is evolved for both undertakings considered as one unit, with the object of excluding competition as far as is possible and delimiting the fields of operation of the two undertakings.

What has been said here should be sufficient to secure from readers that study of Mr. Batson's book which it clearly merits as a serious contribution on a subject of first-rate importance.

CORRESPONDENCE

The "Wrottesley" Clause.

SIR,—I notice in the issue of the "GAS JOURNAL" for July 19 that the Unopposed Bills Committee of the House of Commons has passed the preamble of the East Hull Gas Bill, which, *inter alia*, contains a clause based upon one of the recommendations of the Gas Legislation Committee providing for a reduction in the dividend authorization when gas is sold at a discount exceeding 30%.

On first consideration it would appear but reasonable that the diminution in dividend authorization, in respect of gas sold at a discount exceeding the prescribed figure, should only apply to the discount in excess of that figure, the full authorization being allowed in respect of all discount up to and including 30%.

The effect of the "Wrottesley" clause, if applied, for example, to the case of the South Suburban Company, is shown in the following abbreviated table:

Discount Allowed.	Equivalent Discount for Dividend Authorization Under Bill.
%	%
30	30
31	19·3
35	22·3
40	26·1
41	12·6
45	14·6
50	17 1
51	0·9
55	1·9
60	3·2

I am aware that the clause in question was unanimously adopted by the Departmental Committee, upon which gas undertakings were fully represented, but I have been wondering whether the members fully realized all the effects of what they were agreeing to.

Yours, &c.,
CHARLES CARPENTER.

South Metropolitan Gas Company,
709, Old Kent Road, S.E. 15,
July 31, 1933.

Burning Raw Coal.

SIR,—It is reported that, because "an extensive survey had revealed that on the domestic side the inherited love of the British man and woman for the open coal fire showed no sign of abatement," there is to be a costly campaign to popularize the domestic coal fire. Why such a campaign should be necessary if the inherited love for the open fire is as great as ever, is uncertain, but, in any case, it is an acknowledgment of the progress that is being made in the use of more efficient and smokeless methods of domestic heating.

Authoritative opinion is practically, or probably even wholly, unanimous that the use of raw coal for domestic purposes must, sooner or later, be ended. From the scientific point of view the custom is even now an anachronism; from the economic point of view it is grossly extravagant; and from the public health point of view its consequences are deplorable. Probably it can be defended only by the coal merchants and chimney-sweeps, and by these only upon the grounds of self-interest.

It is generally admitted that the ultimate salvation of the coal industry is in creating a higher value for coal by utilizing it to the highest possible degree—by considering it not as a fuel but as a raw material. Now whatever methods may be used for this purpose, whether processes of carbonization or hydrogenation, or methods yet unknown, it is certain that the combustion of coal in small open grates cannot be contemplated. Therefore, for this and many other reasons—including the abolition of the smoke nuisance—it is for the national good that the present tendency away from the coal fire should be encouraged, and, conversely, it is a gravely retrograde step for any organization to seek to reverse the progress that is being made.

It is hoped that the question will receive the serious attention of all engaged in the Gas Industry.

Yours, &c.,
ARNOLD MARSH,
General Secretary,
National Smoke Abatement Society.

23, King Street,
Manchester 2,
July 31, 1933.

PERSONAL

The tenure of the Gas Light and Coke Company's Gas Research Fellowship at the Imperial College of Science and Technology, South Kensington, by Mr. J. BELL, B.Sc., A.R.C.S., has recently been extended for a second year from Oct. 1 next.

* * *

The Gas Committee of the West Bromwich County Borough Council are recommending the appointment of Mr. JOHN HUNTER RIOCH, of Stoke-on-Trent, as Engineer and Manager of the Corporation Gas Undertaking, in succession to the late Mr. J. W. Allin.

Among the presents at the wedding, at St. Thomas Methodist Church, Exeter, of Mr. HAROLD W. G. MCLAREN and Miss Nellie Florence Criddle, of Bridgwater, was a handsome mahogany grandmother clock from the bridegroom's colleagues on the staff of the Exeter Gaslight and Coke Company.

OBITUARY

LORD BURNHAM.

Included among the many professions and industries which the late Lord Burnham assisted by his influence and knowledge the Gas Industry takes a prominent place. Lord Burnham evinced a lively interest in its position and progress. His speech at the conference dinner, at Southampton in 1927, of the British Commercial Gas Association, under the Presidency of Sir Russell Bencraft, will be remembered by all who were present on that occasion. In the cause of education he was ever active, and the Education Scheme of the Institution of Gas Engineers appealed to his progressive spirit.

At the memorial service held at St. Margaret's, Westminster, on July 24, Sir Francis Goodenough, C.B.E., Chairman of the British Commercial Gas Association, was present; and the former Secretary of the Institution of Gas Engineers, Mr. Walter T. Dunn, M.I.Mech.E., also attended.

THE NEWS OF THE WEEK

The Price of Gas at Aberfeldy has been reduced by 3d., the price now being 6s. per 1000 c.ft.

The Installation of Two New Retorts at the Johnstone Gas-Works, begun in February, is now nearing completion.

Of the 892 Miles of streets and passages in Liverpool, 655 are gas lighted and 237 electrically lighted at an average cost per mile of £130. Liverpool has 12,097 electric street lamps and 17,374 gas lamps.

From an Austrian Contemporary we learn that, owing to the general industrial depression, the total production of gas at the various gas-works in Hungary during last year reached a total of 3520 million c.ft.—a decrease of about 3·5%.

In their Dividend Announcement, the Directors of the Gas Light and Coke Company state that the Company's close association with South-Eastern Gas Corporation, Ltd., is resulting in improved efficiency and economy on both sides.

Improvements Estimated to Cost £9000 are to be effected to their gas-works by the Richmond (Yorks.) Town Council, who, following a report from Mr. F. H. Robinson, an expert, considered the question of erecting entirely new works. They ultimately decided, however, to adapt the present plant to meet the estimated requirements of the Borough for several years to come. A loan of £5500 is to be acquired.

The Rowley Regis Urban District Council have decided to negotiate for the purchase of the Rowley Regis and Blackheath and the Cradley Heath Gas Companies and for the operation of their powers under the Acts. The Clerk has been instructed to communicate with the Ministry of Health and the Board of Trade upon the subject. It has also been agreed to obtain the opinion of an expert in connection with the matter.

Irish Association.—As usual, an attractive programme has been arranged for the Annual Meeting of the Irish Association of Gas Managers at Waterford on Aug. 15. The business meeting takes place in the Town Hall, under the Presidency of Mr. F. J. Edmonds, when papers are to be read by Mr. A. Law and Mr. J. W. Young. At the kind invitation of the Chairman and Directors of the City of Waterford Gas Company, the members and their ladies will be entertained at dinner in the Town Hall in the evening. A "go-as-you-please" day has been arranged for Aug. 16, as it has been found impossible to arrange the usual excursion. The competition for the Grant Golf Cup is in the hands of Mr. T. D. Hamilton, 31, Clifton Road, Bangor.

South-Eastern Gas Corporation.

Two Further Offers Accepted.

The South-Eastern Gas Corporation announces that, as a result of the offers made to stockholders of the Broadstairs Gas Company and of the Gravesend and Milton Gas Light Company (mentioned in the "JOURNAL" last week, p. 196), acceptances have already been received in excess of the minimum quantity required. The offers have therefore become effective.

The terms, as announced last week, provided for acceptance by not less than 55% of the holders.

East Surrey Offer to Purchase Horsham Shares.

The East Surrey Gas Company is offering to purchase from the proprietors of the Horsham Gas Company, Ltd., the whole of their holdings of the original ("A") shares and the additional ("B") shares in that Company on the following terms:

For each £10 original share, £14 10s. in cash, or £10 5% irredeemable debenture stock in the East Surrey Gas Company, and £2 10s. in cash.

For each £10 additional share, £14 5s. in cash, or £10 5% irredeemable debenture stock in the East Surrey Gas Company, and £2 5s. in cash.

The maximum dividend payable on the original shares is 10% and on the additional shares 7%, but 7% has been paid on both classes of shares for a number of years.

Society of British Gas Industries.

A Meeting of the Council was held at 56, Victoria Street, Westminster, S.W., on July 20—Mr. H. E. Bennet, the Chairman, presiding. Those present were: Dr. E. W. Smith (Hon. Treasurer), Col. O. B. F. Planck, Messrs. F. B. Richards, Albert West, H. A. Hobson, Geo. Clark, W. J. Gardner, C. S. Bennett, Frank West, B. B. Waller, T. F. C. Potterton, W. H. Handley, E. J. Davison, F. J. Gould (Hon. Secretary), and Arthur L. Griffith (Secretary). Apologies for absence were reported from Messrs. E. J. Fox, L. Hartley, H. M. Thornton, A. Comley, and D. M. Henshaw.

A resolution submitted from the Joint Gas Conference recommending that a similar conference should be organized in connection with the British Industries Fair, Birmingham, 1934, was approved; and the following were appointed the Society's representatives on the Committee: Mr. H. E. Bennet, Mr. D. W. Turner, and Dr. E. W. Smith.

It was reported that several of the members of the Society

are attending the International Gas Conference and Fifteenth Annual Convention of the American Gas Association in September, and the Chairman of the Council was appointed Leader of the Delegation.

The Autumn General Meeting was fixed for Thursday, Nov. 9, at the Hotel Metropole, London, under the Presidency of the Right Hon. Earl Fitzwilliam, K.C.V.O.

Installation of Gas Ranges.

A copy of "Gas Ranges," being a Gas Appliance Installation and Service Manual issued by the American Gas Association, may be inspected in the Library of the Institution of Gas Engineers, 28, Grosvenor Gardens, London, S.W. 1.

The book is useful to a fitter in two ways. Because of its convenient size it can be carried in his pocket or bag, and he may study the text, if he is inclined that way, at his leisure, and it will make him more capable of handling not only high bill complaints but in discussing such features as location of the gas range, the use of gas-saving devices, flue connection, and other everyday problems which must necessarily confront him in his work.

If the fitter is not inclined along such lines the book nevertheless is useful. The instructions on what to do need not be culled from the text. It is only necessary for him to look at the pictures which have been very simply drawn—specially prepared cut-away photographs mostly. These pictures carry full instructions whereby the fitte can make a better job of adjustment than by experience alone, particularly when confronted with a device that is new to him.

Education and Examinations.

Notification by the Institution of Gas Engineers.

The next Examinations in Gas Engineering will be held on April 28, 1934, and in Gas Supply on May 5, 1934. The Education Calendar for 1934 will be available in December next.

Examinees.

The Comparative Statistical Schedule of the 1932 and 1933 Examination Results shows that the increase of 35% in the number of candidates sitting in 1932 over those who presented themselves in 1931, has been maintained. The published figures of 425 candidates in 1932 and 412 candidates in 1933 may be increased to 481 and 497 respectively, by adding the number of candidates who sit for the Examinations but whose results are not included for the reasons given in the prefatory note to the Results published in last week's "Journal."

Qualifications for Membership of the Institution.

Possession of the Diploma in Gas Engineering (Manufacture) or the Diploma in Gas Engineering (Supply) is one of the qualifications necessary for admittance to the Institution as a Member, while the Higher Grade Certificate in Gas Engineering is required, *inter alia*, for election as an Associate Member. The Higher Grade Certificate in Gas Supply admits to Associateship.

Publications.

Copies of the Royal Charter and By-Laws, Forms of Application for Admittance to the Institution, and copies of the 1933 Examination Questions set by the Institution can be obtained from the Secretary, the Institution of Gas Engineers, 28, Grosvenor Gardens, London, S.W. 1.

Charles Hunt Memorial Medals.

The Charles Hunt Memorial Medals, generously endowed in 1930 by Mr. P. C. Holmes Hunt, on behalf of himself and his brothers and sisters, in memory of their father, are awarded each year to the candidates who achieve the highest standards in the Examinations for the Diplomas in Gas Engineering (Manufacture) and in Gas Engineering (Supply), provided such standard satisfies the Council, on the recommendation of the Gas Education Committee and the Board of Examiners. The medals are not awarded on the 1933 Examinations.

Permission to Sit for Examinations.

Permission to sit for an Examination is given only in respect of the Examination to be held next after such permission is granted. Students have to comply with the Regulations in force at the time of the Examination.

Entries for Ancillary Subject Examinations.

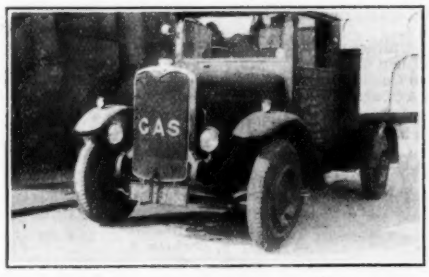
Notification of a candidate's intention to present himself for Examination in a subject ancillary to Gas Engineering or Gas Supply must be received by the Secretary of the Institution before Jan. 15 in each year. External students have to satisfy themselves that they are working to the Syllabus of the Examining Authority in whose area they reside and by whom they would normally be examined. Copies of such Syllabuses can be obtained from the Examining Authority. Candidates are responsible for entering themselves for the Examinations on receipt of instructions from the Institution to that effect, which are issued after the Secretary has received notification of the candidate's intention to present himself for examination in certain subjects.

Coke Oven Gas for Glasgow.

An offer to supply the Corporation of Glasgow with coke oven gas has been been made by Messrs. Wm. Baird & Co., coal and iron masters, Gartsherrie, Lanarkshire. This firm have recently decided to erect new ovens and furnaces at a cost of about £100,000, and claim that they will be able to supply gas at a price lower than that at which it can be made under gas-works conditions.

The proposed offer, which will be discussed at a meeting of the Sub-Committee of the Glasgow Corporation Gas Committee to be held on Aug. 14, makes provision for a supply of about 6 million c.ft. per annum. This represents about one-quarter of the normal summer output and about one-seventh of the winter output. The present cost of production in Glasgow is 1s. 2·24d. per 1000 c.ft. *plus* an additional charge of 1s. 11·49d. for rent, taxes, distribution, and other charges. Bairds state that they hope to be able to supply gas at a cost of 3d. per 1000 c.ft. below the present rate.

Aids to Advertising.



The above snapshot sent us by Mr. G. P. Mitchell, Engineer and General Manager, is of one of the Worcester New Gas Light Company's lorries on which they have fixed the letters "GAS" as an aid to advertising. The letters are cut from sheet copper, tinned, and have the appearance of aluminium.

Public Gas Lighting to the Fore.

Further Proof of Appreciation.

Only a fortnight ago we took occasion to refer to a number of gratifying announcements in regard to the renewal of public lighting contracts in various boroughs for further periods of years—demonstrating the high regard in which gas is held for street lighting purposes. This week reports of a similar character reach us from other distant and widely separated parts of the British Isles, indicating that the great service which gas can render in the efficient and economical illumination of our highways is appreciated not only in the big cities, with their heavy road traffic conditions, but also in the smaller townships and villages which lie further off "the beaten track."

Gas Secures Street Lighting at Annan.

The Town Council of Annan, we learn, have at length settled the question in favour of gas, and, after a long debate, have decided that for the next three years the task of lighting the streets will be delegated to the local Gas Company at a cost of £352 per annum. In the course of the discussion Col. Thorburn pointed out that the Company spent £3000 each year on coal, giving work to miners and carters. If they adopted electric light, the only labour involved in Annan would be the turning of a switch. The local Gas Company has been in existence since 1836.

Dungannon also Chooses Gas.

The Dungannon Urban Council have decided in favour of gas as against electricity for street lighting. The Council

THE NEWS—continued.

had invited offers for approximately 80 lamps from half-an-hour after sunset till midnight, and 20 all-night lamps for the period Aug. 1 to April 30, inclusive. The Dungannon Gas Company, Ltd., quoted 80 lamps, of 100 candle-power, to midnight at £2 per lamp, and 20 all-night lamps of similar candle-power, at £2 15s. per lamp; 150 candle-power to midnight at £2 5s. per lamp, and similar all-night lamps at £3 4s.; 200 candle-power lamps, £2 15s. and £4 for the respective periods. The Company also quoted for a five-year contract at 5s. per lamp less than above prices.

The Electricity Board for Northern Ireland quoted 100-watt lamps, dusk to midnight at £2 3s. per lamp, and all-night, £2 14s. 9d.; 150-watt £3 4s. 6d. and £4 2s. 1d. respectively; and 200-watt £4 6s. and £5 9s. 6d., less 5%.

The tender of the Gas Company for 150 candle-power lamps for one year was accepted.

AFTER 28 YEARS OF ELECTRICITY AT MALTON.

Another pleasing announcement comes from Malton, where the Directors state in their half-yearly report for the period ended June 30 last that the Malton Gas Company have succeeded in obtaining a five years' contract for the public lighting of the town. This is more especially gratifying in view of the fact that the local electrical undertaking have held this contract for the past twenty-eight years.

Gas Undertakings' Miniature Rifle League.

Below is a list of teams shooting in the Gas Undertakings' Miniature Rifle League. The present fixtures extend for summer shooting during July, August, and September, and it is hoped that for the winter League more clubs will be competing.

JULY 1.

British Gas Light Company, Ltd.—Hull A	570	*v.*	Howdon (cards unreturned)	
Cambridge University and Town Gas Light Company	548	*v.*	Gas Light and Coke Company —South Harrow	561
Gas Light and Coke Company —Beckton A	580	*v.*	Gas Light and Coke Company —Beckton B	571

JULY 8.

Beckton A.	579	*v.*	Howdon (cards unreturned)	
British Gas Light Company—Hull A	574	*v.*	Cambridge	551
Beckton B.	576	*v.*	Harrogas	561

JULY 15.

Harrogas	564	*v.*	Beckton A.	588
Cambridge	555	*v.*	Hull A	578
Beckton B.	577	*v.*	Howdon (cards unreturned)	

The British Gas Light Company, Ltd. (Hull), are entering a second team to take over Howdon's fixtures.

Mr. Arthur Hewitt Dedicates the Gas Exhibit in Chicago.

The Gas Industry's exhibit in Gas Industry Hall was dedicated at the Chicago Fair grounds on June 3 by Mr. Arthur Hewitt, President of the American Gas Association. He unveiled a tablet on the "Fountain of Flame," a 14-ft. pilaster-like structure, symbolic of the Industry's service to humanity through the medium of heat.

"The theme of this vast World's Fair is mankind's mastery over Nature," Mr. Hewitt said in his dedication speech. "Few industries illustrate this so well as the Gas Industry. We have taken coal and converted it into the highest form of refined fuel, and have made available a vast treasure chest of bye-products, which have themselves become indispensables of modern life. We have taken natural gas, and have subdued this giant to a point where it has become an obedient servant of home and industry.

"At the beginning of this century, we were the bearers of light. Gas was used for only one thing—illumination. Then came electricity, which threatened for a time to write our epitaph, but which ushered in our re-birth. We cast off our rôle as the bearers of light and entered the infinitely greater opportunities for service awaiting us in the field of heating. To-day we are dispensers of the cleanest and most valuable fuel available to mankind—an achievement so far-reaching in its consequences that it has altered the face of civilization.

"Visible evidences of the Gas Industry's contributions to a century of progress in science and industry are seen in part of this great Exposition project. The formal exhibits located in Gas Industry Hall, Home Planning Hall, General Exhibits Building, and elsewhere portray the old and new in the field of heat utilization and the strides made therein by gas fuel. Ultra-modern developments in home comfort and convenience, depicted in striking fashion in the model homes, rely on gas fuel for their fulfilment. Here gas fuel takes a step forward and enters the realm of air-conditioning, making it possible for the home maker to become his own weather maker, winter and summer.

"In the fabrication of automobile tyres, the manufacture of automobiles, and the production of other articles in some of the 'live' exhibits found on the Fair grounds, gas fuel makes possible the animated and realistic effects. Even more satisfying is the extent to which this great Exposition, spread over 3 miles of lake front, relies upon gas fuel for cooking, space heating, and water heating. Gas dominates the restaurants and other kitchens here as it does elsewhere throughout the nation, and the many structures erected on the Fair grounds are 98% gas-heated. Under this great stretch of 'man-made' land are 26,000 ft. of gas mains—unseen evidence, unfortunately, of the vital service gas is called on to render.

"Into the making of this Exposition have gone five years of courageous planning, unhalted by collapse of trade, slumps, and depressions. Chicago's slogan, 'I Will,' has become a victorious reality. This World's Fair is striking evidence of that. The Gas Industry, like Chicago, moves ahead to greater accomplishments in its service to the people in home and industry."

New Principles of Water Treatment.

The removal and prevention of scale in boilers and pipes are matters of interest to practically everybody. Unfortunately, however, the initial cost and subsequent expense and trouble of maintenance rule out water softening in a great number of cases.

Considerable interest has recently been raised both in this country and abroad by a British invention which embodies entirely new principles of water treatment and which when once installed requires only to be inspected periodically. The apparatus is extremely simple; it consists of one or more glass bulbs containing a little mercury in an atmosphere of rare gases. These bulbs, or, as the makers call them, "Buoys," are held in wire frames which are placed in the feed tank of the plant to be treated in such a manner that the inflowing water imparts a slight movement to them.

The results claimed are certainly remarkable. We are told that boilers in which scale was previously so hard that chipping hammers and chisels made little impression can now be cleaned with a wire brush. In others, scale up to ¼ in. thick has been removed in large pieces right down to metal. The makers also confidently assert that there is no danger of corrosion being started up when once the scale has been removed, and that, on the contrary, in actual practice it has been found that existing corrosion is checked.

Messrs. Scalebuoys, Ltd., of 9, Clements Lane, Lombard Street, E.C. 4, have sufficient confidence in their process to guarantee every domestic installation which they make.

Oil from South Wales Coal.

Committee of Inquiry Formed.

[FROM "THE TIMES."]

A Conference convened at Cardiff on July 28 by the South Wales Industrial Development Council decided to set up a committee of experts, coal owners, and miners' representatives to explore the possibility of building a plant for the production of oil from coal under the Government's scheme for a guaranteed preference.

Councillor George Williams, who presided, said the Development Council were anxious not to miss any opportunity of bringing back prosperity to South Wales, and the fullest investigations would be made to find out whether South Wales coal could be used for the production of oil. Dr. Roy Illingworth, a pioneer in the low-temperature carbonization of coal, declared that the suitability of South Wales coal either for carbonization or hydrogenation could not be questioned. That was particularly true of coal mined in the area known as the South Crop and in Monmouthshire. Which of the two processes would be the more economical was a debatable point. He believed that if a united effort were made the capital would be forthcoming, but it would be necessary to secure the co-operation of the local authorities to give help in the way of reduced rates. Public opinion should also be stirred in the direction of making a more general use of smokeless coal, which in its turn would benefit the health of the community. Dr. Illingworth assured the Conference that the Admiralty

would take all the oil they could produce, and it would be an economic proposition if disposed of at £3 a ton.

Prof. George Knox, formerly Principal of the Treforest School of Mines, expressed the view that the saving that would accrue to the Government as the result of employment being found for men now in receipt of unemployment benefit should encourage them to give their blessing to any scheme. He confirmed Dr. Illingworth's view that South Wales coal was suitable for oil production, and said that the coal on the Southern Crop extending from Swansea in the west to Pontypool in the east contained from 30 to 35% of volatile matter, which was equal to the figure for any other coalfield in the country. South Wales also had ample sites available, but what they wanted most was to impress the public that such a scheme was profitable. "There is still plenty of money in the country," he added, "and there is no reason why a special committee should not be able to prepare a scheme that would compel public confidence."

The committee appointed included Dr. Illingworth and Prof. Knox, as representing the experts; Sir John Beynon, Mr. John Paton, Mr. E. L. Hann, Mr. B. Nicholas, and Mr. J. Picton James, representing the coalowners; Mr. Enoch Morrell, President of the South Wales Miners' Federation, and others, representing the miners; and Mr. E. L. Hughes, South Wales Manager of the National Benzole Company, Ltd., representing the oil interests.

Import Duties Advisory Committee.

The Import Duties Advisory Committee give notice of an application for the addition to the Free List of petroleum coke.

Any representations which interested parties may desire to make in regard to this application should be addressed in writing to the Secretary, Import Duties Advisory Committee, Caxton House (West Block), Tothill Street, Westminster, S.W. 1, not later than Aug. 16, 1933.

Edinburgh Town Councillors Inspect Their Municipal Responsibility.

Twelve Years of Progress.

A number of Edinburgh Town Councillors on July 21 viewed the scene of their municipal responsibility about 240 ft. from the ground. The party were inspecting the new water gas plant at the Granton Gas-Works, and in the course of their visit they went up to the top of the new waterless gasholder. The ventilator, rising from the centre, reaches an extreme height of 260 ft. This holder has a capacity of 5 million c.ft. and the steelwork weighs over 1000 tons, and the structure cost £65,000.

A Robot in Action.

The new carburetted water gas plant, which was the main occasion of the visit, is chiefly impressive on account of its automatism. There is a control table, with an intricate arrangement of levers and valve apparatus. The levers go back and forward and turn sections of the machinery on and off. A chance-comer happening upon the elaborate plant in its special building might have the impression that it was out of action. The functioning is practically silent. There is only the faint click of the control levers, and there is no other sign of movement. During the visit, one of the staff, by intentionally interfering with the automatic control, made a "fault" in the processes that were going on. The processes continued just long enough to enable them to complete the circuit in operation. Then the whole system came to a standstill, and the blare of a horn automatically drew attention to the fact that something was wrong. This was not all. A tell-tale lever indicated exactly which part of the apparatus was at fault, and as soon as this was rectified, the robot-driven machinery proceeded once more to function.

This new water gas plant uses about 50 tons of coke each day, and produces 2½ million c.ft. of gas. The cost of the installation, which was erected by Messrs. Humphreys & Glasgow, was some £21,000. Waste heat boilers are attached which provide the steam required for the process. The total cost of the plant amounted to £22,500.

The visit was also the occasion of a review of the gas enterprise of the Corporation during the past twelve years. It was mentioned that during that period the entire plant, from the retorts to the gasholder, has been reconstructed and modernized. Some £600,000 has been spent on these improvements, and has been practically paid out of the revenue. At the same time the price of gas has been reduced by a half. It is now 2s. 9d., against a former price of 5s. 8d. The price is practically at pre-war rates or lower. The saving in the gas bills of the city is something like £450,000. The production of gas during the twelve years has advanced by about 42%. The annual production is 3500 million c.ft., and the Edinburgh Corporation is now the fourteenth largest supplier of gas in the Kingdom. At the same time, less coal is used to produce the increased quantity of gas. On the last year's working, as the report shortly to be issued will show, there is a surplus of £25,000.

During the visit, members of the Committee went to the top of the vertical retort installation, 90 ft. high, watched the automatic feeders of the retorts, and saw coal wagons tip themselves up automatically, and a stream of coal flowing to the coal-breaking plant—sprayed on the way to keep down the dust. This stream of coal in the winter time flows to the extent of 1000 tons each day.

At the close of the inspection the Convener of the Corporation Gas Committee, Mr. Fergus Harris, congratulated Mr. H. H. Gracie, the retiring Manager, on the efficiency of the Gas-Works. He and others on the Committee had enjoyed working with Mr. Gracie, and they were sorry they were losing him. After having served 40 years and lived a very busy life, he was now retiring. They had been very fortunate in getting as his successor Mr. Jamieson, who had been associated with Mr. Gracie for twelve years.

A Splendid Opportunity.

Mr. Gracie, in thanking the Convener, said when he took over the Gas-Works they were rapidly becoming obsolete, so that Mr. Jamieson and he had a splendid opportunity of putting into practice their years of experience and study. The Committee with their business instinct foresaw the great strides that could be made in the Gas Industry if run on the lines of modern science. They were very proud to feel their efforts had been so successful. The progress of the Undertaking had been phenomenal, and far beyond what they dreamed of. They had succeeded in getting the price down to the pre-war figure. They had a larger amount of gas from the same consumption of coal and the same labour. The surplus labour due to the improved plant had been used in the distribution service. He congratulated Mr. Jamieson on his appointment to carry on this large Undertaking, and he was confident he would continue to give the same efficiency as in the past.

Mr. Jamieson said it had been a great pleasure to work with Mr. Gracie during the past twelve years. In the early days they had sometimes worked from six in the morning till twelve at night and always in the greatest harmony.

Further Dividend Announcements.

Evidence of Maintained Prosperity.

Gas Light and Coke Company.

The Board of the Gas Light and Coke Company have declared the following dividends for the half-year ended June 30, 1933: On the 4% consolidated preference stock at the rate of £4% per annum; on the 3½% maximum stock at the rate of £3 10s.% per annum; and on the ordinary stock at the rate of £5 12s.% per annum.

South Metropolitan.

The Directors of the South Metropolitan Gas Company have declared an interim dividend of 2½% actual on the ordinary stock for the six months ended June 30, 1933.

Croydon.

Dividends in respect of the half-year ended June 30, 1933, were declared by the Directors of the Croydon Gas Company at the following rates per annum: On the redeemable preference stock, 7½%; on the maximum dividend stock, 5%; and on the sliding scale stock, 7%. The dividends will be paid on Sept. 1 next.

East Surrey.

The Directors of the East Surrey Gas Company have announced a dividend at the rate of 6% per annum on the ordinary stock of the Company in respect of the half-year ended June 30 last.

Newcastle-upon-Tyne.

The Directors of the Newcastle-upon-Tyne and Gateshead Gas Company have declared interim dividends of 2% on the preference stock and 2½% on the ordinary stock, payable on Aug. 9. These are the same rates as last year.

Yorktown (Camberley) and District.

The Directors of this Company have declared the following dividends in respect of the half-year to June 30, 1933: At the rate of 5% per annum on the 5% consolidated preference stock; and at the rate of 6¼% per annum on the

THE NEWS—*continued.*

consolidated ordinary stock, both less income-tax, payable on or after Aug. 1, 1933.

Cupar.

The Annual Meeting of Cupar Gas Company was held on Friday, at which the Hon. Sheriff-Substitute Stark presided, when the Directors' report was approved. The price of gas was reduced by 1d. per 1000 c.ft., making it 3s. 6d. Authority was given for the payment of 8¾% dividend on the ordinary stock and 5% on the preference stock.

Metropolitan Gas Company of Melbourne.

We learn from Messrs. John Terry's of Regent Street, Ltd., Agents for the Company, that the net profits for the six months to June 30, 1933, were £95,517; a dividend of 6s. 6d. per share has been declared; an amount of £10,000 has been transferred to reserve account; and a sum of £61,942 has been carried forward.

Industrial Concerns in New Venture.

Coke Oven Products.

A number of well-known industrial concerns are subscribers to the memorandum of association of a recently registered Company bearing the title of Coke Oven Products. The undertaking is limited by guarantee, not having a share capital, and the original number of members is limited to 50, though the Board may register an increase from time to time. Every member of the undertaking contributes to the assets of the Company in the event of its being wound up while he is a member.

The subscribers to the memorandum of association include: South Yorkshire Chemical Works, Thorncliffe Coal Distillation, Harold E. G. West (General Manager (chemicals), Newton Chambers & Co.), United Steel Companies, Chas. F. Ward-Jones (Director of Yorkshire Engine Company), and certain officials of some of the above Companies. The Board consists of not less than three and not more than five Directors, to be known as Executive Directors.

The objects of the concern include the carrying on of the business of owners, manufacturers, distillers, refiners, &c., and dealers in all products produced in connection with coke ovens, collieries, gas and chemical works; also to purchase from and sell to or on behalf of members and others, and to manufacture, all classes of tars, and carry on the business of oil and spirit distillers and refiners; also to treat and deal in all waste or bye-products and substances resulting from the manufacture or treatment of iron, steel, and other minerals; to carry on the business of ship and barge owners, &c., and to purchase, subscribe for, or acquire shares in other concerns, to carry on all kinds of financial business, and promote other companies.

The Company's Solicitors are Messrs. Maxwell Batley & Co., of Africa House, 44-46, Leadenhall Street, E.C. 3.

Manchester District Association of Gas Engineers

Visit to Oldham

Members of the Manchester District Association of Gas Engineers visited on Friday, July 21, the reconstructed Higginshaw Gas-Works of the County Borough of Oldham. They were welcomed by the Mayor, Alderman E. Bardsley, J.P., F.R.G.S., Councillor J. Wilkinson, Chairman of the Gas Committee, Councillor J. G. Wilde, Vice-Chairman, and by Mr. F. Greenhalgh, Gas Engineer and Manager. Full details of the reconstruction of these works appeared in these columns on May 10.

The Association were subsequently entertained at luncheon by the Oldham Corporation Gas Committee.

The Mayor of Oldham (Alderman Bardsley) proposed the toast of "The Manchester District Association of Gas Engineers." He had been informed, he said, that the Association was formed in 1870, and that there were about 210 members, of whom between 70 and 80 were visiting the Higginshaw Gas-Works. It would be interesting, perhaps, to note that Oldham was supplied with gas by a gas and water company as far back as 105 years ago. He was very pleased to learn that one of the first members of the Association, Mr. Booth, who joined the Association in 1870, was still living, while Mr. Charles Wood was the third oldest surviving member of the Association, being elected in 1886. It was also exceedingly gratifying to find that Oldham had contributed to the list of the Presidents of the Association, Mr. John Chadwick having filled that office in 1882 and Mr. Timothy Duxbury in 1908. The Higginshaw Gas-Works was one of which the Corporation, he felt, were justly proud. There was, however, a small fly in the ointment owing to the fact that the introduction of the latest scientific methods had thrown a number of gas-works employees out of work through the automatic appliances installed. An earnest endeavour was being made to find those men work in other directions. Oldham had learned many lessons from the undertakings of other towns, the results of which were now evident in the new works; and, therefore, he hoped that the visiting members would be able to gather much useful information from their visit, of which they could make practical use in time to come.

Mr. D. Dixon, B.Eng., A.M.Inst.C.E. (Nottingham), President of the Association, responded to the toast. Having regard to the fact that the Higginshaw Gas-Works represented the last word in modern gas engineering construction and manipulation, the members of the Association had felt it was extremely desirable for them to be permitted to inspect it. They came, in the first instance, because they wanted to be critical, and, in the second instance, because they wanted to learn something. Personally, he had no hesitation in saying that the Higginshaw Works was the most interesting he had ever seen. The Woodall-Duckham carbonizing plant which had been installed presented many new and interesting features, which were obviously the result of individual thought and engineering skill, and he certainly thought that the credit for this must be assigned to Mr. F. Greenhalgh. Scientific development had made it possible to produce gas at a price which the general public could afford to pay, though, as the Mayor of Oldham had stated, it was unfortunately necessary to dispense with a certain amount of manual labour as the result. The same statement could probably be made of any other industry. Nevertheless, it was better that a few men should be displaced rather than a whole industry should be crippled. He could not agree that the men who were so displaced would be out of work for all time. The object which all public utility undertakings must strive to attain was the greatest benefit for the greatest number, and, in the long run, the men who were temporarily dispensed with would be found suitable employment again. What the Industry required to-day was a greater degree of mechanical, engineering, and chemical knowledge, and doubtless other sciences would have to be brought in to aid in the future. The Association members were men of scientific attainments, and they were determined to make every degree of progress they could for the national economic benefit.

The Oldham Gas Department.

Mr. A. L. Jennings (Spenborough), Junior Vice-President of the Association, proposed the toast of the "Oldham Corporation." He was particularly interested in the visit to the Higginshaw Works in view of the fact that he understood his undertaking was the first one in the North of England to install a Woodall-Duckham plant after Burnley did so. The Higginshaw Works were an outstanding example of how a gas-works should be designed and built. He wished to pay his tribute of congratulation, on behalf of the Association, to Mr. Greenhalgh for the excellent lay-out and the general appearance of the works. The Association were extremely pleased to have him enrolled as a member although he had only been one for a few years. It was noticeable generally now that there was an optimistic feeling with regard to a revival of trade, and he sincerely hoped that Oldham would speedily regain its old prosperity.

Councillor J. G. Wilde, Vice-Chairman of the Gas Committee, responded to the toast. He wished to mention that a short time previously a deputation from Paris had visited the Higginshaw Works, after visiting gas-works all over Europe, and they had expressed the opinion that the Oldham undertaking was the best they had seen.

Mr. F. Greenhalgh, in also responding to the toast, said that when Mr. Bridge, the Secretary, wrote asking permission, on behalf of the Association, for the members to visit the works, the Oldham Corporation Gas Committee readily responded to the request. They were very pleased indeed to welcome them upon such an occasion. It was particularly pleasing to him, personally, that the Mayor of Oldham had referred to the assistance which the Committee had received from various members of the Association before the scheme of reconstruction was launched, because a very great deal of useful information had been gleaned by visits to other works already in operation. The Higginshaw Works were the result of all those useful ideas which had been gleaned, and he, therefore, wished to take the opportunity of expressing his thanks to all those members of the Association who had so kindly tendered advice with regard to the layout and reconstruction of the plant.

After the luncheon a paper entitled "An Endeavour to Formulate a Simple Part-Rate System of Gas Charges to Cover all Gas Sales" was read by Mr. Norman Hudson, Engineer, Manager, and Secretary of the Mirfield Gas Company. This, together with the discussion, will be found in our Technical Record columns to-day.

Oil-Coal Fuels

One of the Sections of the recent World Petroleum Congress in London dealt with the subject of "Oil-Coal Fuels." The session was on July 24, and we reproduce below the summary of the General Reporter.

CHAIRMAN: Prof. G. T. Morgan, O.B.E., D.Sc., F.I.C., F.R.S.
GENERAL REPORTER: R. Lessing, Ph.D., F.I.C., F.Inst.F., M.I.Chem.E., M.Inst.P.T.

The problem of using solid and liquid fuels in intimate admixture for general industrial purposes is not new. Tentative proposals were made from time to time which did not lead to commercial or technical application.

The exigencies of the war directed attention to the possibilities of substituting indigenous coal for imported fuel oils, particularly for naval purposes. Towards the end of 1917, Capstaff and Sheppard began work on preparing colloidal mixtures of coal and oil, and this work led to intensive investigation by the American Submarine Defence Association, under the direction of Lindon W. Bates. At about the same time, and without knowledge of the work begun in America, R. Lessing studied the problem on behalf of the Fuel Oil Section of the Admiralty. [Samples of oil-coal mixtures prepared at the beginning of 1918—*i.e.*, 15½ years ago—were exhibited at the meeting.]

The exploitation of the preparation of "colloidal" fuels was prosecuted by L. W. Bates after the war, but without leading to successful commercial application.

Experiments carried out in England about 1922 by the Great Central Railway, with mixtures of Yorkshire coal or coke breeze, and creosote oil or fuel oil on locomotives gave satisfactory results, but were not followed by the use of such mixtures under regular service conditions.

The general adoption of oil fuel for naval purposes had shown the great advantages, the saving in stokehold personnel, and the general convenience of liquid fuels, and rapid advances were made during the last decade in the use of oil for the propulsion of ships of the Mercantile Marine, both in the furnaces of steam-driven vessels and in Diesel engines of motor ships.

Although an immense amount of literature was published, particularly in the immediate post-war period, on the subject, much of which was based on somewhat inadequate scientific evidence or interpretation, general interest in the problem showed signs of flagging, until it was revived in the summer of 1932 by the announcement that so important an undertaking as the Cunard Steam Ship Company had fitted out one boiler of S.S. "Scythia" for burning a 60/40 mixture of oil and coal, and that this vessel had made a voyage from Liverpool to New York during which 150 tons of this fuel were fired. The results were stated to be satisfactory, although the burners required more frequent cleaning than when oil alone is used.

Interest was further stimulated by the news that experiments with mixtures of tar oil and coal on land boilers in Germany gave promising results.

Advantages of Oil-Coal Mixtures.

The advantages of firing a coal in admixture with oil are obvious:

(1) Coal can be stored in bunkers without interstitial air spaces. The bulk weight of an oil-coal mixture is higher than that of either coal or oil, and the calorific value per unit volume is also superior to either fuel by itself.

(2) It can be pumped from distant and inaccessible bunkers or double bottoms without manual labour.

(3) Coal in such a combination can be fired through burners like gas, oil, or powdered fuel, with the efficiency peculiar to this type of combustion.

(4) The use of coal in Diesel engines in this form appears more easily accomplished than that of a dry coal powder.

(5) Ignition, both in burners or in high-compression engines, is usually effected at a lower temperature or compression than when oil alone is used.

(6) The density of the mixture is higher than that of water. The fire hazard is therefore lower than with oil, as bunkers can be drowned, nor is the mixture liable to spontaneous combustion like coal.

(7) The high density tends to reduce the risk of pollution of harbours and coast lines with oil, provided the mixture is resistant towards the electrolytes in salt water.

(8) The use of oil-coal mixtures permits home-produced solid fuels to be substituted for at least some of that portion of the fuel requirements of a country which for technical or other reasons must be supplied in fluid form.

There are hardly any disadvantages to be put against these advantages, provided technical perfection of the method of preparation is attained, whereby a homogeneous mixture is produced which remains stable in regard to the ratio of oil to coal throughout a bulk of commercial magnitude. The problem of effecting this stability—*i.e.*, the prevention of separation into the components over a lengthy period of time—has not yet been solved with absolute certainty, and nearly all work done in this branch of technology is directed towards this end.

The necessity of reduction to a fine particle size of the coal to be used need not constitute a disadvantage, seeing that the pulverization of coal is now practised on a very large scale. It merely means a certain expense which must be low enough not to affect unfavourably the economic side of the question.

A disadvantage which must be borne in mind is the ash content of the coal. It is not likely that this fuel will ever be generally acceptable, if high-ash coal slacks are used as raw material as is sometimes recommended by its protagonists. The first condition of success is the selection of coals of minimum ash content. If this requirement is not complied with, a fly-ash nuisance will be created which will militate against the adoption of oil-coal mixtures for most purposes.

Terminology.

In the past the term "colloidal fuel" has been widely applied to the material under discussion, while "Fliesskohle" (fluid coal) is used in Germany. There are objections to both terms. The mixture cannot claim a monopoly of the attribute "colloidal," since its two components, oil and coal, are themselves of colloidal nature and each might be justly described as colloidal fuel. The appellation "fluid coal" is hardly justified when, as is usually the case, the greater portion of the material does not consist of coal. It is therefore to be preferred, at this stage of development, to define these products by the generic term "oil-coal fuels."

The published literature dealing with the preparation of oil-coal mixtures is very voluminous. It describes the potentialities of the application of the teachings of modern colloid chemistry to the problem, rather than gives practical results substantiated by scientific evidence. The scientific or quasi-scientific papers published on the subject are largely concerned with stabilizers, fixateurs, protective colloids, and in many cases suffer from the element of secrecy apparently introduced not to avoid disclosure of knowledge, but to hide ignorance. What seems to be a vital question, the suitability of specific types of coal and oil and their compatibility, has barely been touched upon. Many papers and articles in the Technical Press are concerned with comparisons of monetary values of coal, oil, and their mixtures. Such discussions must be considered premature, so long as the technical problem of the preparation of these fuels, satisfactory in every respect, and applicable on a very large scale, has not been definitely solved.

Papers before the Meeting.

The papers discussed at this meeting, though small in number, cover the ground to a remarkable degree. They have the merit of touching fundamental points and of shedding the light of scientific evidence upon them.

A. B. Manning describes work carried out at H.M. Fuel Research Station on the stability of suspensions of coal in oil. He found that petroleum oils, such as paraffin oil and raw fuel oil, whose viscosity, as is well known, does not increase sufficiently with decreasing rate of shear to confer the required stability on coal suspensions therein, can be made to support pulverized coal (85% through 200-mesh I.M.M. screen) by previously dispersing 0·1 to 0·5% of sodium stearate in the oil. The viscosity of the oil under normal conditions of flow is thereby increased, but not unduly. The viscosity at small rates of shear, however, increases rapidly as the rate of shear diminishes, and indeed becomes infinite under the shearing forces involved in supporting small particles of coal. In other words, towards such particles of coal, the dilute gel behaves as an elastic solid and will support them indefinitely. It is not essential that the oil should have a gel structure in order to confer on the coal-in-oil suspension the relative stability requisite for practical purposes (*e.g.*, no appreciable settling in six

months). This degree of stability may be given by any treatment which affects the viscous properties of the oil in such a manner that its viscosity under low rates of shea has a sufficiently high value, while its viscosity at the rates of shear involved in normal flow remains low enough to give suspensions which can be readily pumped, &c. He concludes that the variation of the viscosity of an oil at low rates of shear is the determining factor from the point of view of the stability of suspensions of pulverized coal therein. [Samples of a treated oil supporting coal particles in suspension and of a 60/40 mixture of Persian fuel oil and coal were exhibited.]

G. Benthin in his paper on "Fluid coal from brown coal" attacks the problem primarily from a different angle. He recognizes, as others have done before, that peptization of coal can be effected by treatment with swelling agents, such as creosote or pyridine prior to its incorporation with the oil. In view of the more active character of the humic acids (ulmins) of lignite as compared with those of bituminous coal, Benthin regards brown coal as particularly suitable for preparing oil-coal fuels. He considers the creosote obtained in the carbonization of brown coal as a most suitable peptizing agent because it contains constituents with OH and COCH groups polar to the same groups in the brown coal ulmins. The more concentrated the creosote is employed the better is the peptizing power. Apart from this pre-treatment of the coal, which he prefers to give after the coal has been dried to a moisture content not exceeding 10-12%, Benthin suggests, as does Manning, gel formation in the oil by the addition of soaps or of alkali which can combine with the acidic constituents of the coal to soap-like substances. He considers that the ash content of the coal could be reduced by centrifuging the mixture, if it were possible to peptize the coal residuum—*i.e.*, that portion insoluble in organic solvents and sodium hydroxide.

For Firing Steam Boilers.

W. Schultes in his paper "Experiences with fluid coal in Germany" deals with the practical application of an oil-coal fuel in the actual firing of a steam boiler of Cornish type. He carried out a boiler test on behalf of the Verein zur Ueberwachung der Kraftwirtschaft der Ruhrzechen in Essen with the care and thoroughness customary with this Institution. The fuel was supplied by Messrs. Balcke, of Bochum, but neither the composition nor the mode of preparation were given by that firm. The coal used was a slack from the Friedrich Ernestine pit of which the usual characteristics were ascertained. The oil on analysis was found to be the ordinary anthracene oil fraction of coal tar. The ratio of components was estimated to be 54·64% of coal and 45·36% of anthracene oil.

Stripped of experimental details the work showed that after the boiler, which had been heated up by gas prior to firing the oil-coal mixture, had attained normal running conditions, the fuel gave a steaming efficiency of 81·5%. The mixture was sufficiently fluid to be pumped and led from pressure vessels to the burners. No sedimentation of coal was observed during the two tests, which, however, were of only six hours duration.

The tests are interesting in that only coal and a coal product were employed in the preparation of the fuel. It must also be recognized that the dispersion of coal in a coal tar oil does not present the same difficulties as the use of a petroleum oil as the carrying medium.

Schultes discusses in detail the economics of oil-coal mixtures and gives a formula and a graphical demonstration for the calculation of their monetary value. He fixes a limit for the cost price of oil of R.M.36·35/ton below which the use of oil-coal fuels shows no advantage. Schultes also refers briefly to experiments with oil-coal mixtures in the Rupa-Diesel engine of the Kosmos-G.m.b.H., originally designed for solid fuel. According to a private communication from the designer, Mr. R. Pawlikowski, these trials gave promising results. The mixtures used had also been made with tar oil; the fact that they showed an appreciable tendency to separation makes it desirable to have them repeated with more stable mixtures and with such as contain petroleum oils.

On reviewing the present position of this phase of fuel technology, it must be conceded that, while commercial success on an appreciable scale has not yet been attained, the technical and economic features of the problem of preparing and using oil-coal mixtures in substitution of neat oil fuel show sufficient promise to warrant intensive study of the questions involved, some of which are of a somewhat complex nature. In view of the common interest in this matter, of the producers of coal and oil, one might venture the suggestion that this is a case for joint research, and while the difficulties of such an enterprise are fully recognized, the chances of success of such collaboration might be worthy of discussion.

Leeds Gas Department Display

Our photograph shows the ingenious display of the Leeds Gas Department, in the shape of a decorated car, exhibited in conjunction with the Hunslet National School, in the Advertisement Class, during the recent "Children's Day" celebrations.

THE "JOURNAL" TECHNICAL RECORD

Which contains Reports of Meetings of Gas and Allied Associations

An Endeavour to Formulate a Simple Part-Rate System of Gas Charges to Cover all Gas Sales*

By Norman Hudson, M.Inst.Gas E., Engineer, Manager, and Secretary, Mirfield Gas Company.

In this paper on the above subject I wish to stress, straight away, the fact that the majority of the statements incorporated are solely my own personal opinions, but only formed, as I will endeavour to show, after serious attempts to analyze and appreciate the public opinion and conditions which prevail in the area of supply of the Company I have the honour to serve. Also, that this opinion in some cases is not as rigidly formed as would seem by the finality of some of the statements made; but this method has been purposely adopted in an attempt to evoke either definite support or equally definite disagreement, the latter being just as helpful as the former, since, in view of the lack of applied experience available at the moment, opinion must be the major guiding and helping factor.

First of all, I will make a very broad statement of an opinion I have formed and around which the whole gist of this paper is written—namely, that any multi-part tariff system governing gas sales, if it is to succeed permanently, must be, first, simple, and, secondly, of such construction that it will cover the whole field of gas sales and give a reasonably good chance of securing business in practically every sphere in which gas can be used.

Such an opinion naturally leads to the consideration of the relative values of a simple two-part rate allocating charges via a fixed service charge *plus* a commodity charge on the one hand, and on the other any rate system allocating charges divided under more than two headings, such as:

(*a*) Customer charge covering items controlled by the number of consumers.

(*b*) Manufacturing demand charge covering items controlled by the quantity of gas demanded in 24 hours.

(*c*) Distribution demand charge covering items controlled by the quantity of gas demanded at any small period of time—say, one hour.

(*d*) Commodity charge covering items controlled by the quantity of gas consumed—these charges ceasing when consumption ceases.

If these items are considered separately it will be appreciated that they will vary fairly considerably in different places according to the nature of local conditions, such as consumption per consumer, sales per mile of main, type of district, whether industrial, residential, or rural; and also there is likely to be diversity of opinion as to the correct division of certain operating costs into their respective items of charge.

Still, it is held by some that to allocate equitable charges such a division must be made and each item charged separately. Is it necessary, however, to find a system which is perfect in its fairness of allocating operating costs, and, when having found such a system and found it too complicated for practical application, to refuse any other because it only gives 90% of mathematical and accountancy fairness of charge?

Complexity of an Ideal System.

The very complexity of such an ideal system of charge would be, and is, I am sure, a great handicap and detracts considerably from its successful adoption in this country to cover all the fields of gas sales. Yet, it should be possible, within limits, to achieve this and by such an initial scientific multiple division of operating costs, but with a final simple two-part levy by combining (*a*) with (*c*) and (*b*) with (*d*) with slight modifications. Surely item (*c*) is supplementary to item (*a*), and as, even in a simple two-part rate, it is never intended that all consumers should pay the same service charge, what truer guide as to such a charge than the demand per hour, or, in other words, the capacity rating of the meter?

In fact, the Committee on Gas Charges appointed in 1925 stated in their report that, if a multi-part rate is desired for domestic consumers, and it is thought impracticable to determine the maximum demand by actual measurement, the capacity of the meter may be taken as one of the means of estimating the demand. Hence, why should not an item labelled Service Charge incorporating these two—namely, (*a*) and (*c*)—be relatively easy of decision and fair in its application to whatever type of consumer it is applied.

Then, to turn to items (*b*) and (*d*), the combination of these two items and their resultant charge—say, as the Commodity Charge—does give rise in some cases to inequality of charge, but, generally speaking, such inequality would be of an exceptional and local character. One such point is that dealing with the fair apportionment of capital costs, but since manufacturing demand costs are calculated on the plant up to the holder inlet, and seeing that the plant is usually working 24 hours per day, I think it is not unreasonable in a two-part rate to include this item in the commodity charge, since the interest on capital spent on the works can be calculated fairly as a cost per therm.

This paper does not allow time for a detailed analysis of such anomalies, but I am confident that a reasonably fair allocation of charges over the whole field of gas sales can be obtained by a two-part rate, assisted if necessary by a block rate on a reducing scale for large consumers and moulded to suit local conditions, although such an addition detracts from its simplicity.

In setting out the foregoing views, on that consideration of two-part rate *versus* more than two-part rate, I do so because of my view of the necessity for adopting a system of charge which is capable of application to any type of consumer—the one point, I venture to say, of paramount importance. To whom is a more than two-part rate system applicable? To the quarterly consumer only; and yet in many districts as much as 60% of the gas sold is to prepayment consumers—and then this question: Why consider any system which is not suitable to all your consumers and which will not allow of a low-priced commodity being offered to all and sundry through existing meters and as far as possible under existing methods of charge collection?

Experience at Mirfield.

My Company have gone very thoroughly into this question of charges for gas in an endeavour by analysis to find a way of increasing sales where the majority of the capital expenditure called for by them has been made already, and in this review the position of the prepayment consumer was brought home forcibly.

We found that with our existing charges for gas we were more than holding our own with our quarterly consumers; gas fires, water heaters, cookers, &c., were being installed, particularly in the case of the first two types of appliance. We had offered gas at half-price through a separate meter for gas for heating and hot water supplies, providing a minimum of 30,000 c.ft. per annum was guaranteed; and

* Paper read before the Manchester District Association of Gas Engineers, July 21, 1933.

the resultant business warranted such a departure from previous charges.

Then a special price for central heating by means of hot water or steam was offered, after realizing that under existing charges we should not even be asked to quote. We also offered similar terms in competition with producer gas, and in both cases got the business. Such results convinced us more and more that with a simple two-part tariff giving a reasonably low commodity charge there was plenty of business to be obtained, both big and small. Then the snag arose. What about the prepayment consumer? These consumers are the backbone of the Company I serve, over 60% of its output being taken by them, and it was thought wiser to defer changes in the method of charge until a system could be devised which would allow of its universal adoption through the Company's area of supply.

In this connection I will now deal more especially with the position of the prepayment consumer and the result of the analysis of the business done with them, and, for that matter, with a large portion of our domestic quarterly consumers.

With regard to gas charges in our area, the average prepayment consumer obtains 16 c.ft. per penny after allowances for discount. Quarterly consumers start at 19 c.ft. per penny *plus* meter rents, and, eventually, on the block-rate reductions, get up to 22 c.ft. per penny. Against this coal can be bought as low as 26s. per ton d/d, and coke nuts at 20s. per ton d/d.

After numerous verbal inquiries by canvassers, fitters, &c., the following conclusions were definitely forced upon us—namely, that gas sales to this type of consumer can be divided into two classes, which I will name for want of better headings: (1) Necessitous gas sales; (2) luxury gas sales. In the former the consumption was obtained from lighting fittings, ring burners, cookers, where no other form of cooking apparatus was available, and wash-boilers where no other means of washing was possible. In the latter the consumption was obtained from gas cookers where other cooking facilities were available, wash-boilers where there were already set-pot installations, gas water heaters where a fire-back boiler was fitted, and et ceteras, such as poker burners.

Under the first heading gas at 16 c.ft. per penny can hold the business, and because of circumstances is cheap at that price; but in view of the price of solid fuel in the district what hope is there of really sound business under the second heading? Such business as is obtained is costly to get and of a flighty nature when obtained. Such business does not bring us the increased gas sales we anticipated when the lists of appliances fixed is gone through, and yet the position would be infinitely easier from the gas salesman point of view could we get down to a commodity charge for gas which would be nearly competitive with solid fuel prices.

We have proved at Mirfield by practical tests on consumers' premises the following facts—of course, local conditions play their part:

Gas at 40 c.ft. per penny consumed in modern appliances will compete on cost alone with a good house coal for fires, radiators, and thermal storage water heaters, both large and small, for average period working; also that it is almost as cheap to use gas in the oven of a modern gas cooker at this rate than it is to open the damper to heat up a coal oven, even though the fire be already alight for room-warming purposes.

In view of these results it was thought advisable to examine every possible way of obtaining this end. We increased discounts for large consumptions—in other words, introduced a block-rate system. But with the prepayment consumer this gave very unsatisfactory results, since the meter still gave the same quantity per coin and the general mental decision was as usual: "It is dear, a penny only lasts so long."

Here I would like to say that our experience has forced us most decidedly to disagree with one conclusion of the Committee on Gas Charges, which was to the effect that a block system of charge would meet the case of domestic consumers as a new and business getting method of charge. It will not secure much new business with the prepayment consumer, and will not ease the position concerning unremunerative consumers one jot or tittle.

The psychological value of the amount of service obtained by putting one coin in a meter cannot be too strongly stressed, because the putting-in of the coin is the action most often performed, and as a result creates the most permanent impression. On the other hand, rebate or discount is only given once in a period of weeks—that is, each time the meter is emptied.

There are some who say that they would never abandon the system of initial overcharging followed by a refund, since they hold that many people view their slot meter as a saving bank of sorts. But if that is as far as we can hope to get in scientific salesmanship of gas let us by all means stick to the flat rate; it will be safer, even if the end is not so attractive. One must admit, however, that in some ways there may be valuable financial reasons for setting meters to overcharge, such as a means of collecting rents for appliances not included in the price of gas, in which cases such a system becomes a valuable addition to any scheme of gas sales.

This position had by this time developed. A very creditable percentage of the "necessitous" gas sales possible under our existing method of charge had been obtained, and it was obvious that it was going to be an expensive matter to maintain even that percentage with the competition we had to face from assisted wiring and two-part rate terms then and now being offered as an inducement to the electricity consumer.

Was there a possible way of tapping the "luxury" gas sales or of turning them into possible "necessitous" gas sales, because if such a way could be found which was economically sound it was obvious that such added sales would become remunerative at a lower price than existing sales, since in nearly all cases the major part of the capital expenditure necessary to deliver these goods had already been incurred? This reference is, of course, relative to mains, services, meters, collecting costs, office charges, salaries, &c.

The Scheme Adopted.

After considering various possibilities it was decided that the following scheme might suit our requirements, and it had the advantage that it could be incorporated in a general two-part rate scheme covering all consumers.

To offer to all prepayment consumers having a meter up to and including a Standard No. 2 size the following alternative to the existing flat-rate system. Any consumer paying 6s. 6d. per quarter in advance could have his meter set to give twice as much gas per coin as under the existing flat-rate scheme, and such discounts as already existed—namely, those increasing with quantity consumed on a yearly basis would be maintained at half the rate per 1000 c.ft. consumed paid under the existing rate.

Another advantage seen in this scheme was that it was going to cost very little to put into operation, as the quarterly service charge would be collected as and when the quarterly meters were being read.

An analysis of all prepayment consumers' consumptions was then made in an endeavour to find the worst possible effect such an optional scheme could have on the finances of the Company. The offer meant that to anyone using one shillingsworth of gas per week under present charges the cost would be still 1s. under the new offer—*i.e.*, as against 1s. for gas they would pay 6d. service charge *plus* one shillingsworth of gas at half-price, a further 6d.

We therefore assumed that all consumers using one shillingsworth of gas per week or less would not avail themselves of the offer and that all using more would accept, but still use only the same amount of gas. You will readily admit that this was the blackest possible outlook to take, and the analyses showed that it could result in a drop in receipts of approximately £650 per annum, between 8 and 9% of the net profit.

It was apparent that such a sacrifice, if the worst possible happened for a year or two years, would be well worth while if it opened up a further large field in which gas sales were possible, and if it also consolidated a large amount of gas sales already being effected. So numerous "feelers" were put out in the district to ascertain if possible what view those to whom it would apply had on the matter; and summed up they led us to yet another conclusion: While there were numerous consumers who would adopt such a scheme and forthwith install further appliances, there were objections, the most persistent and only serious one being against the finding of 6s. 6d. in one lump sum before they could have their meter setting altered to the new commodity rate. Again, it is necessary to remember the type of consumer and the level of local wages, and such points.

This was most certainly a difficult position. The cost of collection either weekly or monthly ruled such a method out. Any arrangements of rebates was out of the question, because this meant setting the meter to the maximum charged, whereas we wished to set the meter to half the present price straight away.

A Time-Tariff Attachment.

Such a development led us to the view that a mechanical device combining a given payment per unit of time with control of supply would probably meet the case if the following considerations could also be met:

(1) Reasonable capital outlay.
(2) Robustness of design.
(3) Compactness.
(4) Ease of fixing.
(5) Choice of coins.
(6) To design the mechanism so that the consumer should do everything to cause it to function.

The result has been the construction by the Horstmann

Gear Company, Ltd., of Bath, of the H.H. Time Tariff Attachment, in an endeavour to provide a means whereby a two-part system of charge can be formulated for offer to all consumers with this significant possibility—namely, that for the prepayment consumers the gas meter can be set straight away at the footage per coin represented by the commodity rate adopted.

The time unit adopted is one week, and the coin choice is the sixpenny piece or one shilling piece, the change-over being a simple operation which can be accomplished *in situ*.

The main features of the design are that the mechanism is arranged to fit immediately on to the meter inlet, between that point and the service control tap. A valve is incorporated in the gas-way through the apparatus, the "open" and "shut" positions of which are determined by the presence or otherwise of a coin in the mechanism. Also it is impossible to drop the coin into its gas valve operating position until the clock driving the timing mechanism has been wound up to the "full" by the consumer. As soon as this condition obtains the coin slides into position, and upon the winding handle being released the coin throws open the gas valve and the clock is started.

This condition then persists until seven days have elapsed, when, if no further coin has been put in the gas valve is closed in steps over a period of two hours until finally it is completely closed and the clock stopped. This shut-down position can be obviated by placing in the mechanism another coin before the expiry of the seven-day period but at every insertion the coin will not fall into its working position until the clock has been fully wound.

Again, since the apparatus incorporates a 15-day clock mechanism two coins can be inserted at one winding, the second being automatically fed before the end of the first seven days, and thus the consumer need only visit the apparatus once in 14 days.

It also complied with our requirements inasmuch as after fixing the only attention necessary was limited to maintenance and coin collection, in other words a similar attention to that called for by a prepayment meter, although the maintenance figure should be considerably lower, since the maximum number of coin insertions is limited to 52 per annum.

My Company now think that they have all the necessary means for offering to all consumers an optional simple two-part system of charges assisted by a block rate of a reducing commodity charge according to quantity consumed, which will result in any consumer having gas available from the first cubic foot used at the commodity rate we decide to adopt.

We think that the majority of our least well-off consumers will eventually see the advantage of such an offer and be in a position to find the necessary sixpence per week proposed service charge, whereas, as before mentioned, a single payment of 6s. 6d. at the beginning of each quarter was out of the question.

The financing of such a scheme has also been considered, and at the moment the following method is being examined.

As the scheme offers gas at twice the footage per coin to the consumers paying 6s. 6d. per quarter in advance, the fixing of a mechanism to collect 6d. weekly is really a necessity forced upon us purely for the convenience of the consumer who decides to have one installed as an accommodation to suit his particular financial position. Hence, it would be quite fair that such a consumer should contribute something more than the one who does not force such a necessity and its consequent capital expenditure upon the Company. As a preliminary figure we are examining the contribution of 2 c.ft. per one pennyworth of gas. So, taking once again the consumer now using one shillingsworth of gas per week, if his footage were dropped from 32 c.ft. to 30 c.ft. per penny his contribution would be at the rate of just under 2s. per annum and, if his consumption increased due to the new rates offered, his contribution would grow at the rate of just under 2½d. per 1000 c.ft. consumed.

To sum up, the present position as we view it in our area of supply is to say that under the existing system of charge it is pretty well apparent that the major part of the possible gas sales is at the moment held, but that further to increase this sales figure under such charges will be both costly and the increase, if obtained, precarious.

Examinations and analyses definitely indicate, in our view, that a two-part system of charge would open up a considerable sphere for increased gas sales where the larger part of the necessary capital expenditure has already been incurred. Also it is held:

That it would not be wise to adopt a two-part rate which was not to be available to all classes of consumers, particularly in an area where a certain class, debarred for any reason from not participating, accounts for a considerable portion of the gas sales in that area.

That when such a scheme of an optional nature is offered the fact that in the very early stages a drop in income may obtain must be faced.

That such a scheme would afford a way of gradually reducing the number of unremunerative consumers, whereas the present flat-rate system is tending most definitely to cause that number to increase, with most unfortunate results.

That it is far less dangerous to decide on and offer a two-part rate applicable to all than to pursue any further the granting of special priced supplies for special purposes.

That the present system of charge is out of date, and if we wait for legislation to which we think we are entitled to mend matters the fairly solid foundation on which we have our feet at the moment may by the time it is granted have crumbled to sand into which it will be necessary to drive very expensive piles before we can again erect a sound and useful sales structure.

That to delay in offering some more sensible and attractive scheme than the present flat-rate system is dangerous because of the tendency of our competitors to push two or more part rates with an attractive commodity rate.

That if we do not move our list of unremunerative consumers will grow and our good consumers will have a still bigger load to carry.

That we must design some method within the present bounds of legislation, mould it with what wisdom and foresight we can command to suit our own individual local conditions, and not wait in the fond hope that someone else will do it for us.

DISCUSSION.

Mr. E. Crowther (Bradford) in a written communication which was read by the Hon. Secretary, Mr. J. Bridge (Elland), said: I have read an advance copy of Mr. Hudson's paper with great interest, and am sorry to be unable to be present to hear it delivered and to take part in the discussion. If I may do so, I should be glad to offer a few remarks herewith. Probably no single subject has occupied so much of the thoughts of the Gas Industry during the past several years than has that of systems of charge, and it is, therefore, remarkable that comparatively few of us have ventured to publish the results of our thoughts, much less to give practical effect to them.

Mr. Hudson is entitled to our thanks for this clear statement of his considered opinions, which we may support or otherwise as our own views may dictate. For myself, I am in almost entire agreement with the conclusions expressed in the paper, and find but little room for criticism, and much for commendation.

I would offer the suggestion, however, that Mr. Hudson's preliminary statement of the necessary factors for the success of a multi-part system should include the condition that the system should give a profit not only upon the sum total of sales, but also upon each individual account, both present and prospective, despite any alterations which may take place in the nature of the demands supplied. It is obvious that he recognizes the necessity for this condition, as he stresses both the need for turning unremunerative into remunerative accounts, and the danger of granting special rates for special purposes; none the less, a clear expression of this principle at the outset would add force to the whole paper.

Lack of Clear Comprehension.

In this connection, may I digress to say that I have heard more than one engineer speak in defence of such special rates even after admitting the soundness of the case for the multi-part system, and state that they cannot be entirely dispensed with. Such a view, to my mind, betrays a lack of clear comprehension of the nature of the multi-part system, which definitely in itself, and without extraneous additions, should and does actually provide a special rate for every purpose.

Reverting to the paper, the argument in favour of attaching the whole of the manufacturing demand costs to the commodity charge does not carry complete conviction, as one may readily conceive of two consumers having widely different consumptions per quarter, and yet imposing an identical cost for manufacturing demand upon the undertaking. Partly for this reason, and partly because I consider that the lower the commodity charge the greater is the prospect of success, I consider that a proportion at least of this item should be attached to the service charge in a two-part scheme. Further, if this is done, there is so much less need or justification for stepping down the commodity charge in blocks according to consumption, with resulting simplification.

As Mr. Hudson considers, and as I myself have found, a normal block system, unless very steeply graded, does not bring business.

Apart from these remarks, I consider that the opinions expressed in the paper are entirely sound and logical, and Mr. Hudson is to be congratulated upon a good paper, free from

"padding." He is still more to be congratulated upon his refusal to sit down in the face of the prepayment difficulty. Everyone who has interested himself in the subject has realized that the prepayment consumer is the chief obstacle to a two-part scheme; but so far this is the first practical solution offered to overcome the obstacle, and I think we should wish its inventor every success.

Mr. HUDSON said there was a point which was definitely emphasized in the communication—namely, a case for designing a rate which would give an individual account profit. If the initial multiple division of operating costs was worked out on a four-part rate allocation, and then made out by the additions he had put forward into a two-part rate, then if the divisions were properly made and the allocations were sound, the service charge paid would guarantee the profit on the individual account. Mr. Crowther stated that he did not think that the commodity charge should be purely and simply an addition of the manufacturing demand charge *plus* the commodity when levying a two-part rate. It was pointed out in the paper that there should be the two additions with the necessary modifications to suit the local conditions. Of course, there were certain items in the manufacturing demand charge which would have to be taken out and put on to the service charge if it was not intended to incorporate in the scheme a falling price on the amount consumed. Either of the points met the case of the consumer with identical hourly demands on the concern, with an identical installation but with a bigger consumption per quarter. In other words, more hours were worked.

A FUNDAMENTAL DIFFERENCE.

Mr. C. R. INGHAM (Brighouse) spoke as a next door neighbour of Mr. Hudson, and also as one who had carried out a certain amount of experimental work with regard to gas charges. Many of the remarks contained in the paper were most challenging, and should cause many members to think deeply on the subject of gas charges. Mr. Hudson had stated that for any multi-part tariff to be a success it must be capable of universal application and bring about business in practically every sphere of potential operation. Presumably the word "practically" was inserted in order to allow for special-purpose rates where absolutely necessary. Surely this view ignored the fundamental difference between domestic, industrial, and commercial business. Usually the industrial load was non-seasonal, whereas the domestic load was definitely to some extent seasonal. It would be remarkable, in his opinion, if a two-part tariff which was designed mainly for domestic business—and prepayment business at that—was applicable to present-day industrial and commercial loads. Personally, he did not consider that it would be practicable to establish successfully one rate applicable to all the business. The theoretically perfect rate was generally admitted to be a four-part tariff. Mr. Hudson ruled this out as being too complicated for practical application. He asked, also, if it was necessary to refuse any other system because it only gave 90% mathematical and accountancy fairness of charge. The reply to that question would be, first, that the four-part tariff was not complicated, and, secondly, if a two-part tariff which was 90% successful could be devised, then he, personally, would welcome it; but he did not think it could be obtained. He had been operating a four-part tariff for 4½ years, and during that period there had not been one disputed gas account. Once the fixed charges were agreed upon it became a two-part tariff. In other words, instead of a universal scale to fit the industrial and domestic load there was designed a scale for the domestic load, and the four-part tariff, or something similar, would design a practical two-part tariff applicable to the particular business and load to be considered. The price with the four-part tariff was not very low where there was a seasonal load, or some abnormal load, due to special type of business. On the other hand, where there was a good normal load very cheap gas could be offered. In the case of a domestic rate the two-part tariff was ideal, although if it was possible to have it it must be optional. Mr. Hudson condemned the block rate, especially as regarded the prepayment consumer. The block rate could be applied very suitably to the quarterly ordinary domestic consumer, but there was a difficulty with regard to the prepayment consumer. Even the prepayment consumer who was only getting 16 c.ft. for 1d. would appreciate a larger discount. He could speak from experience in that respect, because his Undertaking had recently introduced a block rate, and had found that they were able to canvass their prepayment consumers, who were now getting bigger discounts. They were getting orders where previously they would probably not have received them.

OPTIONAL TWO-PART TARIFF.

Another method they were adopting in order to deal with the prepayment consumers' difficulty was to offer them an optional two-part tariff with a fixed charge of 9d. per quarter. A meter set at 40 c.ft. for 1d., and a discount, would bring the commodity charge down to 4d. per therm. His Undertaking had not yet actually applied this method because they had only just introduced their block rate, and had not attempted to complicate the issue by offering another system. The offer would be made in the immediate future.

Mr. Hudson's time-tariff arrangement appeared to be ideal in theory, but he did not know how it would work out in practice. However, he hoped to try it out, and if it was a success no one would be more pleased than himself.

Emphasis had been laid upon the domestic load. It was the maximum load of his Undertaking, and they stood or fell by what they did with it. An effort was being made to increase the consumption per consumer, and the only way to achieve success, in his opinion, lay in revised domestic charges. It cost from 2d. to 4d. per therm to supply an extra therm of gas to an existing consumer, and they were charging 7d. to 1s. for it. Was success deserved if charges were made like that? What was necessary for them all to do was to make a thorough investigation of local conditions, because the time for action was the present, and in two or three years it would be too late to move.

Mr. HUDSON said that with regard to the statement that a four-part rate was necessary to divide charges fairly and to suit the call of the industrial consumer, it seemed rather peculiar that a four-part rate was issued in Brighouse. Mr. Ingram had followed up the statement by saying that if he could find a two-part rate which had, say, a 90% chance of being fair in its charges he would welcome it. Personally, he did not for a moment say that a two-part rate was ideal. The thoughts put forward in the paper really covered an attempt at Mirfield to find a rate which provided chances of getting business; which had possibilities of business in practically all spheres in which gas could be used, and which could be applied to everybody. In that analysis, at Mirfield they had come to the same conclusion as Mr. Ingham—namely, that it was far better to devise a two-part rate which would bring in the domestic load first and foremost because it was the maximum load, and then, as far as the industrial load was concerned, there was room for amendments or extension of such a scheme. To levy a four-part rate because it was ideal, and exclude the whole of the prepayment consumers immediately, appeared to be neither more nor less than a blow in the face.

Mr. Ingham had said definitely his undertaking could get new business with the block rate—that was, by reducing prices and giving a bigger discount to the prepayment consumer. Personally, he did not dispute that more business would be obtained, but, on the other hand, Mr. Ingham went on to say that they had a two-part rate up their sleeve for the slot meter which they did not propose to offer at present. He assumed from him that if they were going to offer it after offering a block rate, then they were of opinion that the two-part rate, both for the prepayment and domestic consumer, was better than the block rate.

AN EFFICIENT TURN-STILE.

Mr. J. T. HAYNES (Rotherham) said they were all accustomed to papers dealing with facts and experiences, but Mr. Hudson's paper was also a paper full of reasoning. Thanks to the advertising by the B.C.G.A. and on the part of gas appliance makers, &c., the public had quite a good idea of the advantages of gas, but to a great extent, owing to the ordinary flat-rate prices, all those advantages were enclosed, as it were, inside a big park surrounded by a high wall. In his opinion, the two-part tariff was a very efficient turn-stile, giving the public admission into that park, and, for that reason, he was very much in favour of it. He could almost visualize that in the future all gas for all purposes would be sold at a flat production cost rate, *plus* a sliding scale of service charges to suit a particular demand.

He wished to emphasize several points raised by Mr. Hudson, and more particularly the futility of block systems applied to the small consumer. Secondly, he was very much in favour of the point that a two-part tariff must be applicable to every class of consumer. If they could not do better than offer one class, because of their social standing, particular advantages in price which were denied to other consumers because of their social standing, then they were on wrong lines altogether.

In devising a two-part tariff, the managers of those undertakings which manufactured gas, as distinct from undertakings such as his own, which was in a peculiar position, ought to have in mind the type of load they intended to try for. For instance, one could visualize a water heating load which was going to build up the hollow valleys of the summer load without adding materially to the winter peaks. On the other hand, the gas fire load was going to intensify the winter peaks without doing anything to level up the difference between summer and winter, and all it would do would be to push up the capital costs section of the service charge out of proportion to the increased load. Having determined what particular load was to be aimed at, then a bold attempt should be made to secure it. Speaking as one who had taken the plunge, he might say that the water was not so cold or deep as it might seem to those who were standing on the brink of the stream wondering what it would feel like if they dived in. The increases in consumption had made him perfectly confident that he was on right lines, but only because he had gone "the whole hog." Any increase in the output of gas to an existing number of consumers carried with it little more than the net cost of coal—up to a point admittedly—and therefore all the possible charges ought to be put into the service charge, and the commodity charge made as low as possible. It was necessary to offer gas at a price which made it absolutely competitive with the cheapest fuel available. In the area of his own Undertaking coal was hawked round the town at about 1s. 4d. to 1s. 5d. per bag, while electricity was sold for heating and water-heating purposes at ½d. per unit without any service charge. The competition was exceedingly severe. As the result of a number of observations, his Undertaking had come to the conclusion that for many types of load, including certain industrial loads, for every cwt. of coal which was displaced 1000 to 1200 c.ft. of gas were required. This provided at once, a comparative value of gas as contrasted with an existing fuel. If local coal was being hawked at, say, 1s. 9d. per bag, then the cost of gas per 1000 c.ft., including the service charge, must be in the neigh-

bourhood of 1s. 9d., or 4d. per therm. He did not know whether any of the other members had been able to make a similar calculation, but that form of ready reckoner showed a remarkable degree of accuracy in the work they had been doing at Rotherham.

Get Down to Bedrock Costs.

Claims were often put forward that gas had an additional value owing to its cleanliness, and so on. His own view was that, in the majority of cases, the value of those advantages was far more than compensated for by the cost of the gas appliances necessary to use the additional gas instead of other fuel. Therefore, it was necessary to get down to bedrock fuel costs, and leave out, for the moment, any evaluation of the advantages of gas.

Mr. Hudson said there was only one point in Mr. Haynes' remarks he would like to reply to. He took the basis of coal being sold at Rotherham at 1s. 9d. per bag.

Mr. C. S. Shapley (Leeds): How much is there in a bag?

Mr. Haynes: 1 cwt.

Mr. Hudson: The gas must be sold at 1s. 9d. *plus* service charge. In the paper mention had been made of a good quality house coal at about £2 per ton, and the figure at Mirfield was 40 c.ft. for 1d.—namely, 2s. 1d. per 1000 c.ft., so it was practically an identical comparison.

Mr. E. J. Fottrell (National Gas Council) said that, in company with others, he had for years past felt quite satisfied that the future of the Gas Industry in this country depended upon a radical alteration in views as to the basis of charge. Not only was Mr. Hudson's paper a practical contribution towards the solution of this question, but it was also most opportune. Probably all those present would have in mind the second Interim Report of the Gas Legislation Committee. It would be recalled that that Committee discarded as impracticable the suggestion that a two-part tariff should be made compulsory.

Opinions might vary as to whether they were right or otherwise in that point of view. The important point was that the ground upon which they reached that decision was that it was impracticable to make a two-part tariff applicable to the prepayment consumer. Mr. Hudson, he thought, had shown that that objection had been removed, and that where a two-part tariff could be offered to one class of domestic consumer identical advantages could be offered to every other class of consumer, regardless of any question of social position. Mr. Hudson had quite rightly emphasized the necessity for simplicity, and then said that a two-part tariff should be such as to be available for all classes of consumer. Apparently, what he had in mind was all classes of domestic consumers; the idea that any two-part tariff could be made available to all categories of consumers did not appear to be really sound. The aim should be to make the charge in any particular case approximate as closely as possible to the actual cost of meeting any particular demand.

Central Heating Tariffs.

In dealing with the central heating load of a seaside town where the daily peak occurred in the summer as contrasted with a similar peak in an inland town in the winter, there was obviously a difference in the four-part tariff which would affect the characteristics of the two-part tariff. In the case of an inland town similarly a two-part tariff would certainly not be applicable in the case of a block of offices which were closed on Sundays at a time when in a great number of cases the hourly peak occurred. A two-part tariff applicable to the central heating of office blocks could be properly left out of consideration altogether in regard to the distribution demand. The central heating of churches would most certainly have to be taken into consideration. Therefore, in one category of central heating there would be found to be an initial difficulty in regard to any two-part tariff which would meet two cases.

Another point to which he would like to make reference was that of the block charge. Mr. Hudson quoted the Gas Charges Committee of the National Gas Council quite correctly. He (the speaker) had attended every meeting of that Committee for about three years so that he had some idea of what their views were, even if they were not very fully expressed in the report. It was never in the minds of the Committee that a block rate was what the Americans called a "promotional" rate—namely, a rate which was going to bring new business which was not being obtained at the present time. What they felt really was that the flat rate was bad and must go, and that as long as they were obliged, under the statutory legislation of the present day, to have something in the nature of a flat rate, then the block rate was the best substitute. The two-part tariff was regarded as a desirable optional alternative.

A point had now been reached where output was on the down grade. For about seven years the consumption per consumer had been steadily falling. According to the statistics to-day it was about 2% down on what it was last year, while last year it was slightly down on the year before. The point which the author made in his paper, and which he would call the "Hudson classification of necessities and luxury use," was really the keynote to the line for development. To speak of saturation of gas supply was, of course, to-day palpably absurd. He for one—and others agreed with him—believed that the saturation had been definitely prescribed by the flat rate system of charge. With regard to future developments, the luxury sales referred to by Mr. Hudson could never, in his opinion, be developed except through the introduction of some attractive tariff, though it must be borne in mind that what was a luxury to-day might become the necessity of the future. In the United States a wireless set was not now regarded as a luxury but as a necessity, every home being wired to receive a circuit.

Advertise a Simple Rate.

Mr. Hudson said that Mr. Fottrell had understood his paper quite correctly. He intended the two-part tariff to cover all gas sales. Mr. Fottrell had hoped that he did not, but his point in so doing was really to compare it with the existing rate. He did not decry any attempt to develop the two-part rate further when experience had been gained. The point which was borne in mind at Mirfield was to be able to advertise a rate which was simple, which it was thought would attract business, and if they encountered such obstacles as time loads to consider them more deeply. He thought that the mere fact of advertising a two-part rate whereby it was possible to offer the gas at 1s. 6d. per 1000 c.ft. would be a great factor which would influence the mind of the general public. The electricity people had such a rate. They talked about ½d. per unit, but never mentioned service charges. People had been accustomed to a price for electricity of round about 5d., 6d., or 7d., and the offer seemed to be remarkably cheap. Gas consumers had got used to a price of 3s. 6d., 3s. 9d., and 4s. If gas was advertised for sale at half the price the public would regard it as cheap; a psychological factor which was extremely valuable.

Mr. A. L. Jennings (Spenborough) considered that the paper was full of very good material for consideration. He liked the forceful points yet very modest language with which Mr. Hudson had dealt with his subject. Personally, he hoped that the engineers of gas undertakings as a body were not going to sit down quietly and wait for some one individual member to try out the scheme and then state how it developed. Everyone present was in a position to try it out for himself in his own district, and a collective result could be made known. There was only one point he would like to make in criticism of Mr. Hudson's paper. He always took every opportunity he could of thrusting home the point about selling gas on a unit basis which was comparable with the electrical unit, taking the latter at 4000 B.Th.U. He suggested that Mr. Hudson would do much better if, instead of selling this gas at 6d. per week standing charge, and describing the measurement as being 40 c.ft. for 1d., he described the latter as selling the gas on the unit basis. In this event the 40 c.ft. at 1d. would be equal to ⅕d. for that gas per unit. The public would then appreciate that they were obtaining gas at a price to compete with which electricity would have to be sold at ½d. per unit.

Pioneering at Morecambe.

Mr. T. W. Barratt (Morecambe) mentioned that he had done some little pioneering work in respect of two-part tariffs. The system in Morecambe was based on the principle that the Undertaking was ready to supply so many superficial feet of floor area with so much gas at a fixed charge. They had put the whole of their slot meter consumers on this two-part tariff. The slot meter consumer had a minimum consumption to use in 12 months which was split into a weekly amount. If they used that amount of gas they received a rebate of 1s. 1d., and if they did not they received the ordinary rebate of 5d. By using a certain quantity there was a 2s. 8d. rebate. Being a seaside town, Morecambe had an extremely heavy summer load and a very small winter load. There was no great industrial load. It was possible to sell gas during the winter period to the extent of the summer peak without 1d. increase in cost other than the cost of coal. Therefore, if they could secure an increase in the winter load Morecambe would actually effect a reduction in manufacturing costs. If someone came along and said they would take 20 million c.ft. of gas during the winter months, the Undertaking could afford to let him have the supply at net cost, because the profit would not be made on the 20 million c.ft., but rather on the reduction of cost in manufacturing that amount over the whole of the consumption throughout the town. Gas fires were offered free, and a consumer could have any number of gas fires he desired, paying the fixing cost. There was a fair profit on the fixing costs. During the past two years about 1000 gas fires had been fixed, while washboilers were also supplied free. There was not only very severe electrical competition, but also a very large overhead debt to wipe out.

Mr. Hudson thought that the development of a heating load in the winter would depend upon being able to offer special terms even if Morecambe had to buy the apparatus to develop such a load.

Mr. W. Bennett (Mossley) asked if Mr. Hudson made any distinction with regard to rateable value.

Mr. Hudson replied that the scheme as put forward in Mirfield did make provision for rateable value. They limited the application of the 6d. per week to a house having two rooms downstairs, by which they had eliminated the difference in rateable value due to position. In the Mirfield area rateable values varied considerably according to the position in which the house was built. It would not be quite fair to take rateable value purely as the basis for the service charge, so it had been taken on the number of rooms. If a house had more than two rooms downstairs, the charge per week or per quarter was increased. That covered all domestic fees. Other people not coming into those categories, or asking for a two-part rate on those terms, were given it according to the size of the meter, and the size of the meter was decided, of course, after test by the Gas Committee.

Mr. C. S. Shapley (Leeds) proposed a hearty vote of thanks to Mr. Hudson for his interesting and informative paper, which was seconded by Mr. G. S. Frith (Runcorn), and carried unanimously by acclamation.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

Despite the collapse of American prices, business on the Stock Exchange continued steady and active last week. In the belief that trade is definitely improving, home industrials were in good demand, and a feature was the strength of British Railway stocks brought about by the good results disclosed by the half-yearly statements.

A further large number of transactions was recorded in the Gas section, prices in many instances being a shade higher compared with the previous week, though with few exceptions quotations remained unaltered. In fact, the demand is such at the present time that those desirous of obtaining holdings in any but the larger undertakings may have some difficulty in satisfying their requirements.

Preference and debenture issues continue firm favourites and several improved in value. East Surrey 5% debenture rose 2 points to 119½, while Gas Light 4½% debenture, Primitiva 4% (1911) debenture, South Metropolitan 3% debenture, and Wandsworth 5% preference improved 1 point each. The margin of South Metropolitan ordinary widened and showed a gain of 1 to 129½.

The three Metropolitan Companies are paying the same interim dividend on ordinary stocks as last year—viz., Gas Light £2 16s.%, South Metropolitan £2 10s.%, and Commercial £2 10s.%, while the Tottenham and District is maintained at £3 7s. 6d.%.

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *July* 31.

The market for tar products continues steady; current prices are as under:

Pitch, 80s. per ton f.o.b.
Creosote, 3d. per gallon.
Refined tar, 4d. to 4¼d. per gallon in bulk at makers' works.
Pure toluole is firm at about 2s. 6d.; pure benzole, 1s. 9d.; solvent naphtha, 95/160, 1s. 7d.; and 90/140 pyridine bases, about 4s. 3d., all per gallon naked at makers' works.

Tar Products in the Provinces.

July 31.

The average prices of gas-works products during the week were: Gas-works tar, 31s. to 36s. Pitch—East Coast, 75s. to 77s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 75s. to 77s. 6d.* Toluole, naked, North, 1s. 9d. to 1s. 10d. Coal-tar crude naphtha, in bulk, North, 6d. to 6¼d. Solvent naphtha, naked, North, 1s. 5½d. to 1s. 6d. Heavy naphtha, North, 10d. to 11d. Creosote, *ex* works, in bulk, North, liquid and salty, 2d. to 2½d.; low gravity, 2d.; Scotland, 2d. to 2¼d. Heavy oils, in bulk, North, 4d. to 4¼d. Carbolic acid, 60's, 2s. 7½d. to 2s. 9d. Naphthalene, £9 to £10. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2¾d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *July* 29.

While prices remain substantially as last quoted there has been very little new business placed during the week.

Crude gas-works tar.—Actual value remains at 42s. 6d. to 47s. 6d. per ton *ex* works.

Pitch.—There are only a few inquiries in circulation, and export price is round 75s. to 77s. 6d. per ton f.o.b. Glasgow. Small quantities for home trade command 75s. per ton f.o.r. in bulk.

Refined tar to Ministry of Transport Specification is a fraction easier at 3⅞d. to 3½d. per gallon f.o.r. in buyers' packages.

Creosote oil.—Stocks are reduced very considerably and prices are steady. B.E.S.A. Specification is 2⅝d. to 2¾d. per gallon; low gravity, 2⅜d. to 2⅝d. per gallon; and neutral oil, 2⅝d. to 2¾d. per gallon—all in bulk *ex* works.

Cresylic acid.—Few orders are being placed, but quotations show no alteration. Pale, 97/99%, is 10d. to 11d. per gallon; dark, 97/99%, 9d. to 10d. per gallon; and pale, 99/100%, 1s. 1d. to 1s. 2d. per gallon—all f.o.r. in buyers' packages.

Crude naphtha remains scarce at 4d. to 4½d. per gallon *ex* works in bulk.

Solvent naphtha.—Supplies being short prices are firmer at 1s. 4d. per gallon for 90/160 grade, and round 1s. per gallon for heavy 90/190 grade.

Motor benzole is nominal at 1s. 5d. per gallon f.o.r.

Pyridines.—90/160 grade is 3s. to 3s. 3d. per gallon, and 90/140 grade 3s. 3d. to 3s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole	0	9	to	0	9½	per gallon at works
Motor "	1	4	"	1	4½	" " "
Pure "	1	7½	"	1	8	" " "

Contracts Advertised To-Day.

Coal.

Sidmouth Gas Department. [p. 268.]

Trade Notes.

Electrostatic De-Tarrer.

Messrs. Simon-Carves, Ltd., Cheadle Heath, near Manchester, have received a repeat order for an electrostatic detarring unit from the Gas Light and Coke Company for installation at their Southall Works.

Metropolitan Gas Companies' Testings.

The Gas Referees' report on the official testings for the past quarter gives the following average calorific values for the gas supplied by the Metropolitan Companies named.

Commercial Gas Company.—503·6 B.Th.U. (declared calorific value, 500 B.Th.U.).

Gas Light and Coke Company.—502·6 B.Th.U. (declared calorific value, 500 B.Th.U.).

South Metropolitan Gas Company.—562·6 B.Th.U. (declared calorific value, 560 B.Th.U.).

South Suburban Gas Company.—561·7 B.Th.U. (declared calorific value, 560 B.Th.U.).

Tottenham and District Gas Company.—500·7 B.Th.U. (declared calorific value, 500 B.Th.U.).

Wandsworth and District Gas Company.—500·7 B.Th.U. (declared calorific value, 500 B.Th.U.).

Parliamentary Intelligence.

[From Our Special Correspondents.]

House of Lords.

Private Bills.

The following Bills received the Royal Assent on July 28: Gsa Light and Coke Company; East Hull Gas; South Metropolitan Gas.

Special Orders.

Special Orders made on the application of the Watford and St. Albans Gas Company, the Borough of Wallasey, and the Chester United Gas Company were approved on July 27.

House of Commons.

Special Orders.

Special Orders made on the application of the Borough of Wallasey, the Chester United Gas Company, and the Watford and St. Albans Gas Company were approved by the House on July 26.

STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

Issue. £	Share.	When ex-Dividend.	Dividends. Prev. Hf.-Yr. % p.a.	Dividends. Last Hf.-Yr. % p.a.	NAME.	Quotations. July 28.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
1,551,868	Stk.	Apl. 3	7⅝	7	Alliance & Dublin Ord. ...	120—130	...	...
374,000	,,	July 10	4	4	Do. 4 p.c. Deb. ...	85—95	...	...
557,655	,,	Mar. 6	7	7	Barnet Ord. 7 p.c.	157—162	...	160
300,000	1	May 8	1/4½	1/9⅔	Bombay, Ltd.	25/—27/-	...	...
178,280	Stk.	Feb. 20	9½	9½	Bournemouth sliding scale	195—205	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	157—162	...	160—161½
439,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	137—142	...	139
50,000	,,	June 26	3	3	Do. 3 p.c. Deb. ...	74—79	...	...
162,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	99—104	...	...
210,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	120—125	...	...
357,900	,,	Mar. 6	7½	7½	Brighton, &c. 6 p.c. Con. ...	153—158	...	...
540,000	,,	,,	6¾	6¾	Do. 5 p.c. Con. ...	142—147	...	...
195,500	,,	,,	6	6	Do. 6 p.c. B Pref.	133—138	...	136½
1,487,500	,,	July 24	5	5	Bristol 5 p.c. max.	108½—109½*a*	−1½	...
120,420	,,	June 26	4	4	Do. 1st 4 p.c. Deb. ...	99—100*a*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	99—100*a*	...	...
852,790	,,	,,	5	5	Do. 5 p.c. Deb.	119—122*a*	...	...
855,000	,,	Apl. 3	7	8	British Ord.	147—152	...	150½—151½
100,000	,,	June 26	7	7	Do. 7 p.c. Pref.	145—150	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	108—113	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	94—99	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	103—113	...	...
160,000	,,	June 26	5	5	Cambridge 5 p.c. Deb. ...	115—120	...	...
100,000	10	May 22	6	4	Cape Town, Ltd.	7—8	...	7⅞
100,000	10	Apl. 24	4½	4½	Do. 4½ p.c. Pref. ...	6—7	...	...
150,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb. ...	87—92	...	...
626,860	,,	July 24	6	6	Cardiff Con. Ord.	117—122*	−2	...
237,860	,,	June 26	5	5	Do. 5 p.c. Red. Deb.	105—110	...	...
157,150	,,	Feb. 20	5	6½	Chester 5 p.c. Ord. ...	107—112½	...	...
98,936	1	May 22	2/-	2/-	Colombo, Ltd. Ord.... ...	25/—30/-	...	30/-
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	18/6—20/6	...	...
609,204	1	Mar. 20	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	17/6—20/-	...	18/6—19/6
296,053	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	1⅞—1⅞	...	22/6—23/3
1,796,955	Stk.	July 24	6½	5	Commercial Ord.	110—115*	−2	—
475,000	,,	June 12	3	3	Do. 3 p.c. Deb. ...	73—78	...	74½—75½
265,372	,,	Mar. 6	—	5	Do. 5 p.c. Deb. ...	120—125	...	120—122½
807,560	,,	Feb. 20	7	7	Croydon sliding scale ...	145—150	...	148—149½
469,590	,,	,,	5	5	Do. max. div.	101—106	...	...
500,000	,,	July 10	5	5	Do. 5 p.c. Deb.	118—123	...	...
542,270	,,	Mar. 6	7	10	Derby Con.	155—165*c*	...	...
55,000	,,	July 10	4	4	Do. 4 p.c. Deb.	93—98*c*	...	...
209,000	,,	Mar. 6	5	5	East Hull Ord. 5 p.c. ...	106—111	...	110½
179,500	,,	Mar. 6	6	6	East Surrey Ord. 5 p.c. ...	122—127	...	123
155,019	,,	June 26	5	5	Do. 5 p.c. Deb. ...	117—122	+2	118
1,002,180	,,	Apl. 3	†5	†7	European, Ltd.	131—136	...	133—135
19,373,992	,,	Feb. 20	5⅝	5⅝	Gas Light & Coke 4 p.c. Ord.	25/9—26/9*f*	...	25/9—26/1½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max. ...	84—87	−1	84—85½
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	99—102	...	100½—102
6,102,497	,,	June 12	3	3	Do. 3 p.c. Con. Deb. ...	76—79	...	76½—78
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	113—116	...	115—115⅝
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	111—114	+1	112½
270,466	,,	Mar. 6	6	6	Harrogate New Cons. ...	115—120	...	...
82,500	,,	Mar. 6	7	7	Hastings & St. L. 5 p.c. Conv.	138—143	...	...
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	110—115	...	...
70,000	10	Apl. 24	†10	†10	Hongkong & China, Ltd. ...	14—15	...	...
213,300	Stk.	Mar. 6	6	6	Hornsey Con. 5½ p.c. ...	122—127	...	...
5,600,000	,,	May 22	10	14	Imperial Continental Cap.	212—222	...	£214—216½
223,130	,,	Feb. 6	3½	3½	Do. 3½ p.c. Red. Deb.	89—94	...	...
235,342	,,	Mar. 6	8½	8½	Lea Bridge 5 p.c. Ord. ...	170—175	...	...
2,145,907	,,	Mar. 6	6	6	Liverpool 5 p.c. Ord. ...	125½—126½*b*	−½	...
245,500	,,	June 26	5	5	Do. 5 p.c. Red. Pref. ...	103—113*b*	...	...
306,088	,,	July 17	4	4	Do. 4 p.c. Deb. ...	99½—101½*b*†	...	...
165,736	,,	Feb. 20	8	10	Maidstone 5 p.c. Cap. ...	180—200	...	...
56,176	,,	July 10	3	3	Do. 3 p.c. Deb. ...	69—74*	...	...
75,000	£	June 12	†10	†10	Malta & Mediterranean ...	9—11	...	...
392,000	—	Apl. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	98—103	...	...
231,978	Stk.	Mar. 6	5	5	M. S. Utility "C." Cons. ...	103—108	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	93—98	...	97½—98
112,126	,,	June 26	4	4	Do. 4 p.c. Deb. ...	100—102	...	101—101½
148,955	,,	,,	5	5	Do. 5 p.c. Deb. ...	118—118	...	...
675,000	,,	21 May '31	†6	†6	Montevideo, Ltd.	55—65	...	58—58½
2,061,315	,,	Mar. 6	5	5½	Newcastle & Gateshead Con.	24/6—25/6*d*	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	98—100*d*	−1	...
776,706	,,	July 10	3½	3½	Do. 3½ p.c. Deb. ...	91—93*d*	...	...
277,285	,,	May 8	5	5	Do. 5 p.c. Deb. '43...	107—109*d*	...	...
274,000	,,	Feb. 20	5	5	Newport (Mon.) 5 p.c. max.	102—104*a*	...	...
204,940	,,	Mar. 20	7½	7½	North Middlesex 6 p.c. Con.	137—143	...	...
396,160	,,	Feb. 6	5	5	Northampton 5 p.c. max. ...	103—108	...	...
300,000	,,	Apl. 24	9	7	Oriental, Ltd.	114—119	...	...
316,617	,,	June 26	8	8	Plym'th & Stonehouse 5 p.c.	158—163	...	...
504,416	,,	Feb. 20	8	8	Portsm'th Con. Stk. 4 p.c. Std.	161—166	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	104—109	...	...
114,000	,,	Feb. 20	5	5	Preston 5 p.c. Pref.	103—108	...	...
686,312	,,	July 24	4	4	Primitiva 4 p.c. Rd. Db. 1911	83—88*	+1	...
389,813	,,	June 26	4	4	Do. 4 p.c. Cons. Deb.	82—87	...	...
150,000	10	Mar. 20	6	6	San Paulo 6 p.c. Pref. ...	6⅞—7⅛	...	...
1,736,968	Stk.	Sept. 5	6	6	Sheffield Cons.	124—128*e*	...	...
95,000	,,	July 10	4	4	Do. 4 p.c. Deb.	90—94*e*	...	...
133,201	,,	Feb. 20	8½	5	Shrewsbury 5 p.c. Ord. ...	125—130	...	...
90,000	10	June 12	†5	†4	South African	3—5	...	...
6,709,895	Stk.	Feb. 20	5	7	South Met. Ord.	127—132	+1	128—131
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	135—140	...	137½—138½
850,000	,,	,,	—	20/-*g*	Do. 4 p.c. Irred. Pf.	99—103	...	101½
1,895,445	,,	July 10	3	3	Do. 3 p.c. Deb. ...	76—79	+1	77½
1 000,000	,,	July 24	5	5	Do. 5 p.c. Red. Deb.	110—114*	−2	...
209,820	,,	Mar. 6	8½	8½	South Shields Con.	149—151*d*	...	...
1,543,795	,,	Feb. 20	6	6	South Suburban Ord. 5 p.c.	124—129	...	128½
300,000	,,	,,	5	5	Do. 5 p.c. Pref.	113—118	...	114—115
868,837	,,	June 26	5	5	Do. 5 p.c. Deb.	118—123	...	120—121
647,740	,,	Feb. 20	5	5	Southampt'n Ord. 5 p.c. max.	107—112	...	110½
121,275	,,	June 26	4	4	Do. 4 p.c. Deb.	99—104	...	...
350,000	,,	Mar. 6	9/-	5½	Swansea 5½ p.c. Red. Pref.	109—113	...	...
200,000	,,	June 26	6½	6½	Do. 6½ p.c. Red. Deb.	103—108	...	...
1,076,490	,,	Mar. 6	6¾	6¾	Tottenham and District Ord.	142—147	...	...
300,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	123—128	...	126—127
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
199,005	,,	June 12	4	4	Do. 4 p.c. Deb. ...	96—101	...	...
85,701	,,	Apl. 3	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	80—85	...	...
347,769	,,	Mar. 6	7	7	Uxbridge, &c., 5 p.c. ...	140—145	...	144
88,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
1,322,220	,,	July 10	7	7	Wandsworth Consolidated	142—147	...	...
1,096,378	,,	,,	5	5	Do. 5 p.c. Pref.	113—118	+1	...
1,317,964	,,	June 26	5	5	Do. 5 p.c. Deb.	118—123	...	122
158,400	,,	Mar. 6	5	6A	Winchester W. & G. 5p.c. Con.	109—114	...	...

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. *g.*—For quarter. *h.*—Paid £3, including 10s. on account of back dividends. * Ex. div. † Paid free of income-tax. ‡ For year.

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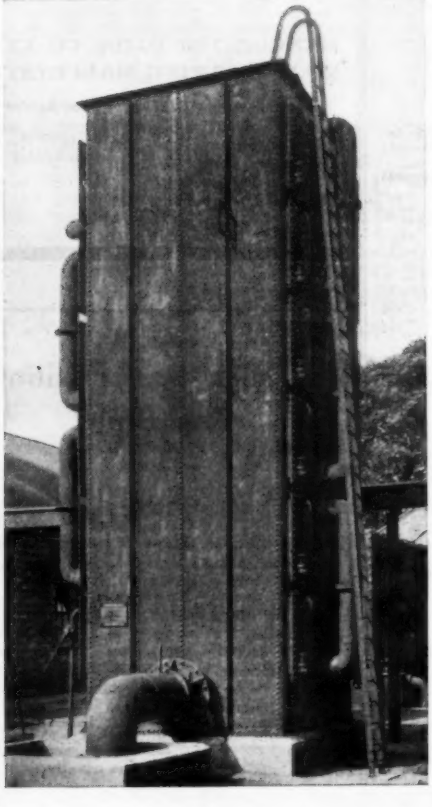

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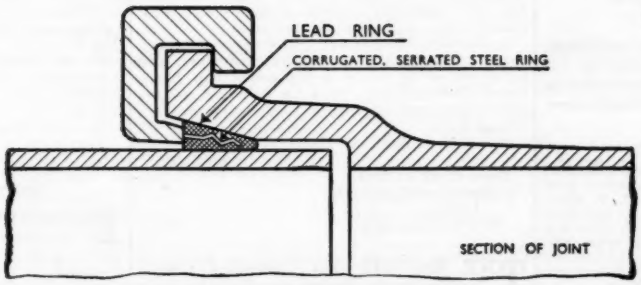

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Applications (stating Age, Qualifications, Experience, present and previous Appointments, and accompanied by *copies* of not more than Three recent Testimonials) must be delivered to the undersigned on or before Wednesday, the 9th August next.
WILLIAM HENRY TYRER,
Town Clerk.
Town Clerk's Office,
Municipal Buildings,
Wigan,
July 19, 1933.

THE Sheffield Gas Company invite Applications for the Position of ASSISTANT SALES SUPERINTENDENT.
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The commencing Salary will be £350 per Annum.
Applications, stating Experience, and accompanied by Testimonials, to be addressed to the undersigned and lodged not later than Thursday, August 10th, 1933.
RALPH HALKETT,
General Manager and Secretary.
Gas Offices,
Commercial Street,
Sheffield,
July 29, 1933.

COUNTY COUNCIL OF THE COUNTY OF LANARK.
(GAS DEPARTMENT.)

WORKS MANAGER.

APPLICATIONS are invited for the Position of WORKS MANAGER at Uddingston Gas-Works.
Applicants must be fully trained Engineers, and have a thorough knowledge of Glover-West Vertical Retorts, Electrical Plant, and High and Low Pressure Distribution, must have Commercial Experience, and be fully competent to design and carry out any alterations and extensions of Works and Plant.
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Applications, with *copies* of Testimonials, stating Age, Experience, and Training, and endorsed "Gas-Works Manager," should be addressed to the undersigned on or before Saturday, 12th August, 1933.
J. MCGHIE,
ROBERT BRYCE WALKER,
County Clerks.
Lanarkshire House,
191, Ingram Street,
Glasgow.

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(GAS DEPARTMENT.)

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Applications, giving Age and full details of past Experience, together with *copies* of not more than Three Testimonials, to be sent to "The Chairman of the Gas Committee," Town Hall, Leek, not later than the 12th August, 1933.
H. HENSHAW,
Clerk to the Council.
Town Hall,
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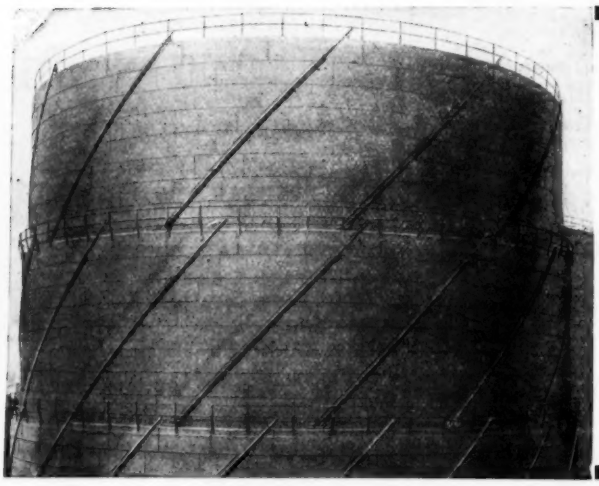

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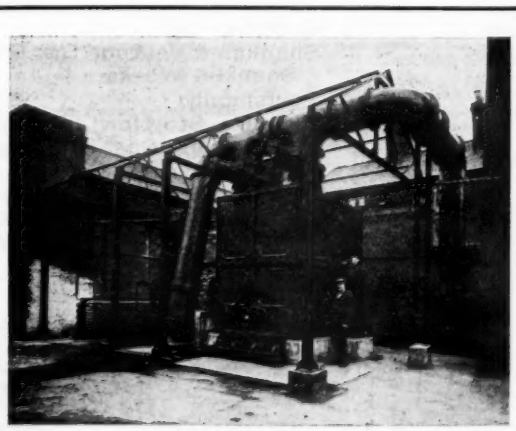

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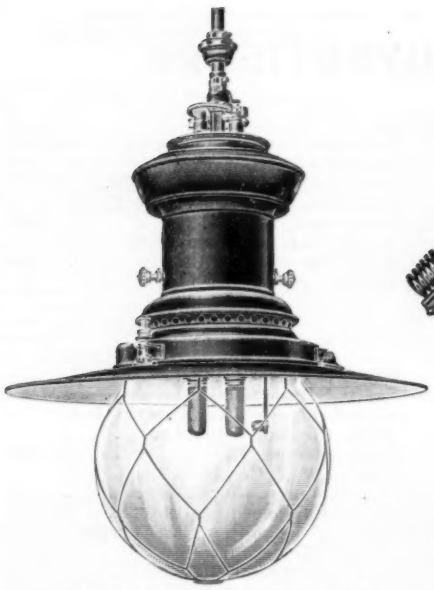

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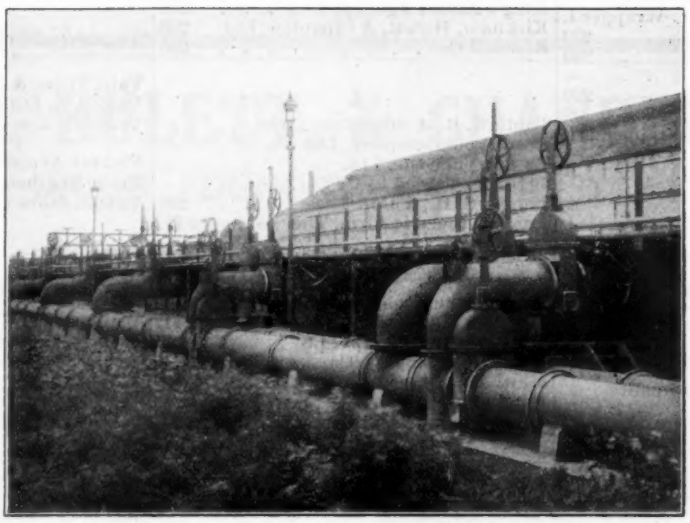

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